



FCC PART 15C ISED RSS-247 TEST REPORT No.I21Z70032-EMC08

for

Samsung Electronics Co., Ltd.

Notebook PC

NP750XDA

with

FCC ID: ZCANP750XDA

ISED Number: 25314-NP750XDA

Hardware Version: REV1.0

Software Version: Windows10-Pro

Issued Date: 2021-03-29

Note:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z70032-EMC08	Rev.0	1st edition	2021-03-29

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISCED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China100191

Location2: CTTL(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35℃
Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2021-02-05
Testing End Date: 2021-03-25

1.5. Signature



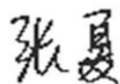
Li Yan

(Prepared this test report)



Zhang Ying

(Reviewed this test report)



Zhang Xia

Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

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Fax: /

2.2. Manufacturer Information

Company Name: Samsung Electronics Co., Ltd.
Address: Samsung R5, Maetan dong 129, Samsung ro
Youngtong gu, Suwon city 443 742, Korea
Contact: Sunghoon Cho
Email: ggobi.cho@samsung.com
Telephone: +82-10-2722-4159
Fax: /

3. PRODUCT INFORMATION

3.1. About EUT

Description	Notebook PC
Model name	NP750XDA
FCC ID	ZCANP750XDA
ISED Number	25314-NP750XDA

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of T CTTL-Telecommunication Technology Labs, CAICT

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version
UT12a	2170032UT12a	REV1.0	Windows10-Pro
UT33a	2170032UT33a	REV1.0	Windows10-Pro

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE

AE ID*	Description	SN	Remarks
AE1	AC Adapter	/	/
AE2	Travel Adapter	/	/
AE3	battery	/	/
AE1			
	Model	PD-65ABH	
	Manufacturer	Chicony Power Technology Co., Ltd.	
	Length of cable	/	
AE2			
	Model	EP-TA865	
	Manufacturer	Dong Yang E & P Inc.	
	Length of cable	/	
AE3			
	Model	AA-PBSN4AF	
	Manufacturer	SDI	

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment Under Test (EUT) was a Notebook PC with Bluetooth, Bluetooth Low Energy and 802.11 a/b/g/n/ac/ax capabilities in the 2.4 GHz and 5 GHz bands.

Antenna information

Item	Spec.	Vendor	Vendor Model
Antenna	/	Inpaq	/
Antenna	/	Speed	/

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the Client.

3.5. Test Configuration

The software DRTU provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

3.6. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor $k=2$.

Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters, referring to Annex A for detailed information, is supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C:	2019
	15.205 Restricted bands of operation;	
	15.209 Radiated emission limits, general requirements;	
ANSI C63.10	15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	2013
	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	
	Spectrum Management and Telecommunications –	
ISED RSS - Gen	Radio Standards Specification	Issue 5 2019
	General Requirements for Compliance of Radio Apparatus	
	Digital Transmission Systems (DTSs), Frequency	
ISED RSS-247	Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	Issue 2 2017
	Federal Communications Commission Office of Engineering and Technology Laboratory Division	
	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON	
KDB 558074 D01	DIGITAL TRANSMISSION SYSTEM, FREQUENCY	2019
	HOPPING SPREAD SPECTRUM SYSTEM, AND	
	HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	

Note: The test methods have no deviation with standards.

5. Test Results

5.1. Summary of Test Results

Abbreviations used in this clause:

- P** Pass, The EUT complies with the essential requirements in the standard.
- F** Fail, The EUT does not comply with the essential requirements in the standard
- NA** Not Applicable, The test was not applicable
- NP** Not Performed, The test was not performed by CTTL

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of ISED	Verdict
Radiated Spurious Emission	15.247, 15.205, 15.209	RSS-247 5.5 RSS-Gen 8.9	P
AC Power line Conducted Emission	15.107, 15.207	RSS-Gen 8.8	P

Please refer to **ANNEX C** for detail.

The measurement is made according to ANSI C63.10.

5.2. Statements

CTTL has evaluated the test cases requested by the applicant /manufacturer as listed in section 5.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.2

5.3. Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage

For this report, if the test cases listed above are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	T nom	26°C
Voltage	V nom	4.0V
Humidity	H nom	20-75%

6. Test Facilities Utilized

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	R&S	1 year	2021-09-04
2	BiLog Antenna	VULB9163	9163-482	Schwarzbeck	1 year	2021-11-04
3	Dual-Ridge Waveguide Horn Antenna	3117	00139065	ETS-Lindgren	1 year	2021-10-11
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	1 year	2021-08-05
5	Vector Signal Analyzer	FSV40	101047	R&S	1 year	2021-05-18
6	Loop Antenna	HFH2-Z2	829324/007	R&S	1 year	2021-12-10
7	Test Receiver	ESU26	100235	R&S	1 year	2022-02-23

AC Powerline Conducted Emission

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	LISN	ENV216	101459	R&S	1 year	2021-04-09
2	Test Receiver	ESCI	100766	R&S	1 year	2022-03-09

7. Measurement Uncertainty

Radiated Spurious Emission

Measurement Uncertainty:

Frequency Range	Uncertainty(dBm) (k=2)
9kHz-30MHz	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.40
$1\text{GHz} \leq f \leq 18\text{GHz}$	4.32
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

AC Power-line Conducted Emission

Measurement Uncertainty (k=2)	3.10dB
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ANNEX A: EUT parameters

Disclaimer: The antenna gain provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX B: Antenna Requirements

According to FCC 47 CFR § 15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- (1) The antennas of the EUT are permanently attached.
- (2) The EUT complies with the requirement of §15.203

ANNEX C: Detailed Test Results

C.1. Radiated Spurious Emission

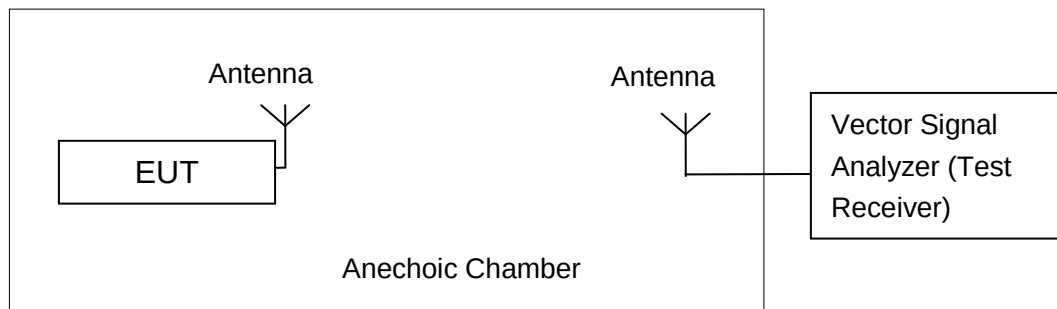
Specification Reference

FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 5.5, RSS-GEN, 8.9

Method of Measurement

Testing was performed in according with ANSI C63.10-2013 and KDB 558074.

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.



Note: Emissions below 18GHz were measured at a 3 meter test distance while emission above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

Measurement Limit

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 section 5.5	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency (MHz)	Field strength(μ V/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength(dB μ V/m)	Measurement distance(m)
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Test settings

Frequency of emission (MHz)	RBW/VBW
30-1000	100KHz/300KHz
1000-4000	1MHz/3MHz
4000-18000	1MHz/3MHz
18000-26500	1MHz/3MHz

Sample Calculation

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + \text{Cable Loss} + \text{Antenna Factor}$$

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

Test Notes

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
2. Investigation has been done on all channel, modes and modulations/data rates. Only the radiated emissions of the configurations that produced the worst case emissions are reported in this section.

C.1.1 Radiated Spurious Emission- above 1GHz

Speed

Average Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2389.500	46.47	2.9	32.0	11.60	54.0	7.5	H	28
2389.560	46.45	2.9	32.0	11.59	54.0	7.5	H	48
4803.700	26.67	-33.3	34.1	25.82	54.0	27.3	H	92
7205.800	27.79	-31.2	35.8	23.17	54.0	26.2	H	72
9607.900	29.06	-30.6	36.7	22.95	54.0	24.9	H	226
12010.000	31.91	-28.9	38.7	22.13	54.0	22.1	H	4

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2426.160	46.31	2.9	32.0	11.38	54.0	7.7	H	18
2454.240	46.36	2.9	32.1	11.39	54.0	7.6	H	4
4882.000	27.06	-33.3	34.2	26.23	54.0	26.9	H	20
7322.800	29.30	-30.9	35.8	24.37	54.0	24.7	H	28
9763.600	29.84	-30.3	36.9	23.30	54.0	24.2	H	4
12205.300	32.92	-28.0	38.8	22.11	54.0	21.1	H	40

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.520	49.72	2.9	32.1	14.71	54.0	4.3	H	6
2483.580	49.43	2.9	32.1	14.41	54.0	4.6	H	26
4960.300	27.23	-33.6	34.2	26.64	54.0	26.8	H	92
7439.800	28.02	-31.7	35.9	23.84	54.0	26.0	H	24
9920.200	30.12	-30.0	37.1	23.02	54.0	23.9	H	136
12399.700	32.54	-28.1	38.9	21.69	54.0	21.5	H	356

$\pi/4$ DQPSK Ch 0

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2389.920	46.38	2.9	32.0	11.51	54.0	7.6	H	92
2389.980	46.39	2.9	32.0	11.52	54.0	7.6	H	26
4803.700	27.73	-33.3	34.1	26.88	54.0	26.3	H	222
7205.800	28.83	-31.2	35.8	24.22	54.0	25.2	H	248
9607.900	29.79	-30.6	36.7	23.69	54.0	24.2	H	46
12010.000	32.46	-28.9	38.7	22.69	54.0	21.5	H	68

$\pi/4$ DQPSK Ch 39

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2426.580	46.38	2.9	32.0	11.45	54.0	7.6	H	354
2453.400	46.33	2.9	32.1	11.36	54.0	7.7	H	28
4882.000	26.98	-33.3	34.2	26.15	54.0	27.0	H	348
7322.800	29.20	-30.9	35.8	24.27	54.0	24.8	H	345
9763.600	29.81	-30.3	36.9	23.27	54.0	24.2	H	184
12205.300	32.90	-28.0	38.8	22.09	54.0	21.1	H	182

$\pi/4$ DQPSK Ch 78

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.520	48.99	2.9	32.1	13.97	54.0	5.0	H	8
2483.580	48.56	2.9	32.1	13.54	54.0	5.4	H	6
4960.300	27.32	-33.6	34.2	26.73	54.0	26.7	H	25
7439.800	28.51	-31.7	35.9	24.33	54.0	25.5	H	70
9920.200	30.41	-30.0	37.1	23.32	54.0	23.6	H	135
12399.700	32.81	-28.1	38.9	21.96	54.0	21.2	H	270

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2389.320	46.39	2.9	32.0	11.53	54.0	7.6	H	24
2389.980	46.39	2.9	32.0	11.52	54.0	7.6	H	336
4803.700	27.88	-33.3	34.1	27.03	54.0	26.1	H	248
7205.800	29.03	-31.2	35.8	24.42	54.0	25.0	H	268
9607.900	29.93	-30.6	36.7	23.83	54.0	24.1	H	290
12010.000	32.65	-28.9	38.7	22.87	54.0	21.4	H	300

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2427.240	46.35	2.9	32.0	11.43	54.0	7.6	H	116
2454.540	46.36	2.9	32.1	11.39	54.0	7.6	H	139
4882.000	26.96	-33.3	34.2	26.12	54.0	27.0	H	94
7322.800	29.13	-30.9	35.8	24.20	54.0	24.9	H	49
9763.600	29.82	-30.3	36.9	23.28	54.0	24.2	H	4
12205.300	32.78	-28.0	38.8	21.97	54.0	21.2	H	28

8DPSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.520	49.06	2.9	32.1	14.0	54.0	4.9	H	28
2483.580	48.73	2.9	32.1	13.7	54.0	5.3	H	248
4960.300	27.71	-33.6	34.2	27.1	54.0	26.3	H	38
7439.800	28.87	-31.7	35.9	24.7	54.0	25.1	H	98
9920.200	30.83	-30.0	37.1	23.7	54.0	23.2	H	183
12399.700	33.02	-28.1	38.9	22.2	54.0	21.0	H	356

Peak Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2337.734	60.80	2.8	31.9	26.02	74.0	13.2	V	22
2371.320	60.14	2.9	32.0	25.30	74.0	13.9	H	44
4804.000	38.45	-33.3	34.1	37.60	74.0	35.5	H	88
7206.500	40.40	-31.2	35.8	35.78	74.0	33.6	V	66
9608.000	40.91	-30.6	36.7	34.81	74.0	33.1	H	220
12010.000	44.95	-28.9	38.7	35.18	74.0	29.0	V	0

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2369.800	44.55	-35.3	32.0	47.91	74.0	29.4	H	22
2508.000	44.99	-35.0	32.1	47.83	74.0	29.0	H	0
4882.000	38.00	-33.3	34.2	37.16	74.0	36.0	V	44
7323.000	40.30	-30.9	35.8	35.38	74.0	33.7	H	22
9764.000	41.66	-30.3	36.9	35.12	74.0	32.3	V	0
12205.000	43.64	-28.0	38.8	32.84	74.0	30.4	V	44

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2484.145	61.02	2.9	32.1	26.00	74.0	13.0	H	0
2487.505	60.31	2.9	32.1	25.29	74.0	13.7	H	22
4960.000	38.92	-33.6	34.2	38.33	74.0	35.1	H	88
7440.000	40.15	-31.7	35.9	35.96	74.0	33.9	V	22
9920.000	41.96	-30.0	37.1	34.87	74.0	32.0	V	132
12400.000	44.73	-28.1	38.9	33.88	74.0	29.3	H	352

$\pi/4$ DQPSK Ch 0

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2328.984	60.37	2.8	31.9	25.60	74.0	13.6	H	88
2364.110	60.30	2.8	32.0	25.48	74.0	13.7	H	22
4803.500	39.13	-33.3	34.1	38.28	74.0	34.9	V	220
7206.500	40.52	-31.2	35.8	35.89	74.0	33.5	V	242
9608.000	41.08	-30.6	36.7	34.97	74.0	32.9	V	44
12011.000	44.48	-28.9	38.7	34.70	74.0	29.5	V	66

$\pi/4$ DQPSK Ch 39

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2365.000	44.65	-35.3	32.0	48.01	74.0	29.4	H	0
2513.000	44.51	-34.9	32.1	47.26	74.0	29.5	H	22
4882.000	37.94	-33.3	34.2	37.11	74.0	36.1	V	352
7323.000	39.56	-30.9	35.8	34.63	74.0	34.4	V	352
9764.000	40.56	-30.3	36.9	34.02	74.0	33.4	H	176
12205.000	44.82	-28.0	38.8	34.01	74.0	29.2	V	176

$\pi/4$ DQPSK Ch 78

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2484.620	60.21	2.9	32.1	25.19	74.0	13.8	H	0
2485.920	60.58	2.9	32.1	25.55	74.0	13.4	V	0
4960.500	39.49	-33.6	34.2	38.90	74.0	34.5	H	22
7439.500	39.91	-31.7	35.9	35.73	74.0	34.1	H	66
9920.000	42.44	-30.0	37.1	35.34	74.0	31.6	V	132
12400.500	44.15	-28.1	38.9	33.31	74.0	29.8	H	274

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2368.436	60.18	2.9	32.0	25.35	74.0	13.8	H	110
2378.642	59.82	2.9	32.0	24.97	74.0	14.2	V	132
4804.000	39.85	-33.3	34.1	38.99	74.0	34.2	H	242
7206.000	40.51	-31.2	35.8	35.89	74.0	33.5	V	264
9608.000	42.39	-30.6	36.7	36.28	74.0	31.6	V	286
12010.500	44.81	-28.9	38.7	35.03	74.0	29.2	V	308

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2371.000	44.12	-35.3	32.0	47.49	74.0	29.9	V	110
2513.000	43.84	-34.9	32.1	46.59	74.0	30.2	V	132
4882.000	38.13	-33.3	34.2	37.29	74.0	35.9	H	88
7323.000	40.37	-30.9	35.8	35.45	74.0	33.6	H	44
9764.000	42.25	-30.3	36.9	35.71	74.0	31.8	H	0
12205.000	44.17	-28.0	38.8	33.36	74.0	29.8	H	22

8DPSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.570	60.51	2.9	32.1	25.50	74.0	13.5	H	22
2489.885	60.66	2.9	32.1	25.63	74.0	13.3	H	242
4960.000	39.10	-33.6	34.2	38.52	74.0	34.9	V	44
7439.500	40.48	-31.7	35.9	36.30	74.0	33.5	H	88
9920.000	43.35	-30.0	37.1	36.25	74.0	30.7	V	176
12400.000	44.62	-28.1	38.9	33.77	74.0	29.4	H	0

Conclusion: Pass

Note: the spurious emission above 18G is noise only.

Inpaq

Average Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2389.600	46.43	2.9	32.0	11.57	54.0	7.6	V	265
2389.980	46.33	2.9	32.0	11.46	54.0	7.7	V	45
4803.700	24.76	-33.3	34.1	23.91	54.0	29.2	H	47
7205.800	26.87	-31.2	35.8	22.25	54.0	27.1	V	180
9607.900	27.97	-30.6	36.7	21.86	54.0	26.0	V	265
12010.000	31.33	-28.9	38.7	21.55	54.0	22.7	H	224

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2433.540	46.62	2.9	32.0	11.69	54.0	7.4	V	150
2446.860	46.58	2.9	32.1	11.62	54.0	7.4	V	65
4882.000	24.92	-33.3	34.2	24.08	54.0	29.1	H	333
7322.800	27.32	-30.9	35.8	22.39	54.0	26.7	V	196
9763.600	28.44	-30.3	36.9	21.90	54.0	25.6	H	354
12205.300	31.77	-28.0	38.8	20.97	54.0	22.2	H	223

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.580	46.56	2.9	32.1	11.55	54.0	7.4	V	156
2483.820	46.48	2.9	32.1	11.47	54.0	7.5	V	21
4960.300	24.35	-33.6	34.2	23.76	54.0	29.7	V	178
7439.800	26.56	-31.7	35.9	22.37	54.0	27.4	V	331
9920.200	28.86	-30.0	37.1	21.77	54.0	25.1	H	153
12399.700	31.65	-28.1	38.9	20.80	54.0	22.4	V	69

$\pi/4$ DQPSK Ch 0

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2388.720	46.39	2.9	32.0	11.53	54.0	7.6	V	130
2389.980	46.42	2.9	32.0	11.55	54.0	7.6	V	312
4803.700	25.09	-33.3	34.1	24.24	54.0	28.9	V	18
7205.800	27.22	-31.2	35.8	22.61	54.0	26.8	H	2
9607.900	28.33	-30.6	36.7	22.22	54.0	25.7	H	238
12010.000	31.55	-28.9	38.7	21.77	54.0	22.5	H	130

$\pi/4$ DQPSK Ch 39

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2482.886	46.48	2.9	32.1	11.47	54.0	7.5	V	349
2450.280	46.55	2.9	32.1	11.59	54.0	7.4	V	283
4882.000	25.28	-33.3	34.2	24.44	54.0	28.7	V	240
7322.800	27.71	-30.9	35.8	22.79	54.0	26.3	H	113
9763.600	28.66	-30.3	36.9	22.13	54.0	25.3	V	63
12205.300	32.00	-28.0	38.8	21.20	54.0	22.0	H	3

$\pi/4$ DQPSK Ch 78

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.520	46.50	2.9	32.1	11.49	54.0	7.5	V	24
2484.060	46.45	2.9	32.1	11.43	54.0	7.5	V	354
4960.300	24.91	-33.6	34.2	24.32	54.0	29.1	H	175
7439.800	26.85	-31.7	35.9	22.66	54.0	27.2	V	238
9920.200	29.18	-30.0	37.1	22.08	54.0	24.8	H	304
12399.700	31.83	-28.1	38.9	20.98	54.0	22.2	H	133

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2389.500	46.39	2.9	32.0	11.52	54.0	7.6	V	309
2389.980	46.36	2.9	32.0	11.49	54.0	7.6	V	290
4803.700	25.25	-33.3	34.1	24.39	54.0	28.8	H	195
7205.800	27.42	-31.2	35.8	22.81	54.0	26.6	V	174
9607.900	28.47	-30.6	36.7	22.37	54.0	25.5	V	290
12010.000	31.59	-28.9	38.7	21.82	54.0	22.4	H	246

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2434.020	46.55	2.9	32.0	11.62	54.0	7.4	V	69
2448.900	46.54	2.9	32.1	11.57	54.0	7.5	V	20
4882.000	25.30	-33.3	34.2	24.46	54.0	28.7	H	86
7322.800	27.80	-30.9	35.8	22.88	54.0	26.2	H	356
9763.600	28.92	-30.3	36.9	22.38	54.0	25.1	H	174
12053.000	32.09	-28.7	38.7	22.09	54.0	21.9	H	334

8DPSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.520	46.50	2.9	32.1	11.48	54.0	7.5	V	289
2484.540	46.45	2.9	32.1	11.43	54.0	7.5	V	353
4960.300	25.03	-33.6	34.2	24.44	54.0	29.0	V	350
7439.800	27.05	-31.7	35.9	22.86	54.0	27.0	V	41
9920.200	29.35	-30.0	37.1	22.25	54.0	24.7	H	284
12399.700	31.96	-28.1	38.9	21.12	54.0	22.0	V	70

Peak Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2382.590	60.37	2.9	32.0	25.51	74.0	13.6	H	264
2386.566	59.76	2.9	32.0	24.90	74.0	14.2	H	44
4804.000	35.78	-33.3	34.1	34.92	74.0	38.2	V	44
7206.000	38.45	-31.2	35.8	33.84	74.0	35.5	V	176
9608.000	40.25	-30.6	36.7	34.14	74.0	33.8	V	264
12010.000	42.85	-28.9	38.7	33.07	74.0	31.2	H	220

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2272.800	44.01	-35.4	31.9	47.52	74.0	30.0	V	154
2575.600	45.06	-35.0	32.2	47.83	74.0	28.9	V	66
4882.000	36.43	-33.3	34.2	35.60	74.0	37.6	V	330
7323.000	38.28	-30.9	35.8	33.36	74.0	35.7	V	198
9764.000	39.54	-30.3	36.9	33.00	74.0	34.5	V	352
12205.000	43.00	-28.0	38.8	32.19	74.0	31.0	V	220

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.705	59.74	2.9	32.1	24.72	74.0	14.3	V	154
2484.440	59.55	2.9	32.1	24.53	74.0	14.5	H	22
4960.000	36.01	-33.6	34.2	35.42	74.0	38.0	V	176
7440.000	38.81	-31.7	35.9	34.62	74.0	35.2	V	330
9920.000	40.97	-30.0	37.1	33.87	74.0	33.0	H	154
12400.000	43.02	-28.1	38.9	32.17	74.0	31.0	H	66

$\pi/4$ DQPSK Ch 0

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2361.968	59.81	2.8	32.0	24.99	74.0	14.2	H	132
2373.210	60.28	2.9	32.0	25.44	74.0	13.7	V	308
4804.000	36.21	-33.3	34.1	35.36	74.0	37.8	H	22
7206.000	38.44	-31.2	35.8	33.83	74.0	35.6	H	0
9608.000	40.45	-30.6	36.7	34.34	74.0	33.6	H	242
12010.000	42.15	-28.9	38.7	32.37	74.0	31.9	H	132

$\pi/4$ DQPSK Ch 39

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2333.800	43.60	-35.3	31.9	46.95	74.0	30.4	V	352
2563.000	44.20	-34.9	32.2	46.89	74.0	29.8	H	286
4882.000	36.15	-33.3	34.2	35.31	74.0	37.9	V	242
7323.000	39.59	-30.9	35.8	34.66	74.0	34.4	H	110
9764.000	39.69	-30.3	36.9	33.15	74.0	34.3	V	66
12205.000	42.52	-28.0	38.8	31.72	74.0	31.5	H	0

$\pi/4$ DQPSK Ch 78

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.630	59.48	2.9	32.1	24.46	74.0	14.5	H	22
2484.340	60.00	2.9	32.1	24.98	74.0	14.0	V	352
4960.000	36.24	-33.6	34.2	35.66	74.0	37.8	H	176
7440.000	38.64	-31.7	35.9	34.45	74.0	35.4	H	242
9920.000	40.23	-30.0	37.1	33.13	74.0	33.8	V	308
12400.000	43.55	-28.1	38.9	32.70	74.0	30.5	V	132

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2374.064	60.26	2.9	32.0	25.43	74.0	13.7	H	308
2385.978	60.22	2.9	32.0	25.36	74.0	13.8	H	286
4804.000	35.77	-33.3	34.1	34.92	74.0	38.2	H	198
7206.000	38.62	-31.2	35.8	34.01	74.0	35.4	H	176
9608.000	39.62	-30.6	36.7	33.51	74.0	34.4	H	286
12010.000	43.19	-28.9	38.7	33.41	74.0	30.8	V	242

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2365.800	44.68	-35.3	32.0	48.05	74.0	29.3	H	66
2536.660	43.81	-34.8	32.2	46.40	74.0	30.2	H	22
4882.000	36.57	-33.3	34.2	35.73	74.0	37.4	V	88
7323.000	38.07	-30.9	35.8	33.15	74.0	35.9	H	352
9764.000	39.86	-30.3	36.9	33.32	74.0	34.1	V	176
12205.000	43.00	-28.0	38.8	32.20	74.0	31.0	H	330

8DPSK Ch 78

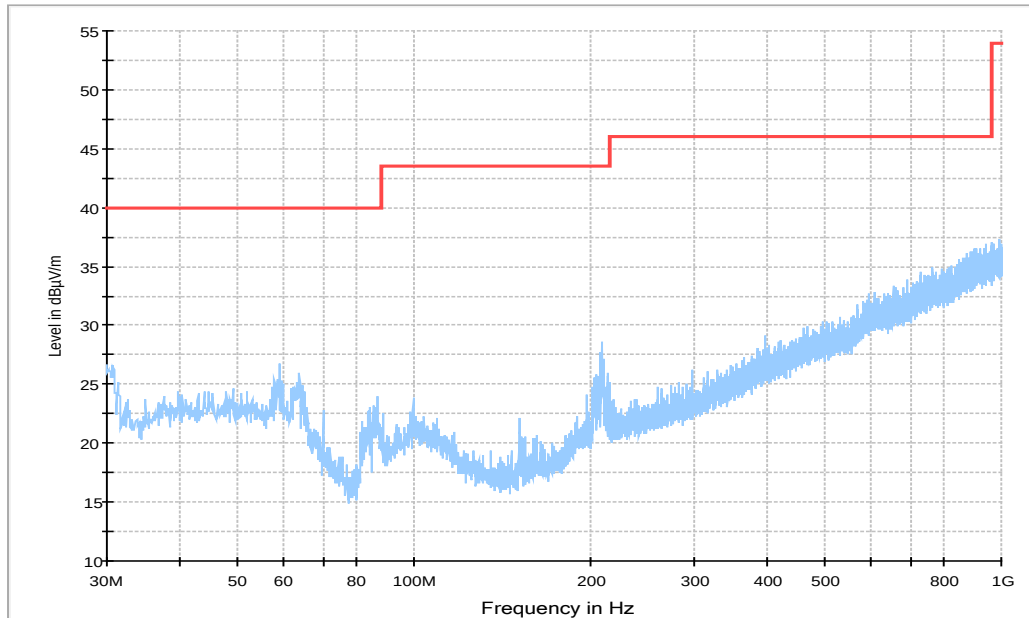
Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
2483.685	59.91	2.9	32.1	24.89	74.0	14.1	V	286
2484.505	60.00	2.9	32.1	24.98	74.0	14.0	V	352
4960.000	35.94	-33.6	34.2	35.35	74.0	38.1	H	352
7440.000	38.34	-31.7	35.9	34.15	74.0	35.7	V	44
9920.000	40.58	-30.0	37.1	33.49	74.0	33.4	H	286
12400.000	43.22	-28.1	38.9	32.37	74.0	30.8	V	66

Conclusion: Pass

Note: the spurious emission above 18G is noise only.

C.1.2 Radiated Spurious Emission- Below 1GHz

WOSRT CASE BELOW 1GHz



BELOW 30MHz

There are no emissions found below 30MHz with in 20dB of the limit.

C.1.3 Band Edges Compliance– Radiated

Speed

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.31GHz ~2.45GHz	Fig.1	P
	78	2.45GHz ~2.5GHz	Fig.2	P

Mode	Channel	Frequency Range	Test Results	Conclusion
$\pi/4$ DQPSK	0	2.31GHz ~2.43GHz	Fig.3	P
	78	2.45GHz ~2.5GHz	Fig.4	P

Mode	Channel	Frequency Range	Test Results	Conclusion
8DPSK	0	2.31GHz ~2.45GHz	Fig.5	P
	78	2.45GHz ~2.5GHz	Fig.6	P

Inpaq

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.31GHz ~2.45GHz	Fig.7	P
	78	2.45GHz ~2.5GHz	Fig.8	P

Mode	Channel	Frequency Range	Test Results	Conclusion
$\pi/4$ DQPSK	0	2.31GHz ~2.43GHz	Fig.9	P
	78	2.45GHz ~2.5GHz	Fig.10	P

Mode	Channel	Frequency Range	Test Results	Conclusion
8DPSK	0	2.31GHz ~2.45GHz	Fig.11	P
	78	2.45GHz ~2.5GHz	Fig.12	P

Conclusion: PASS

Test graphs as below

Speed

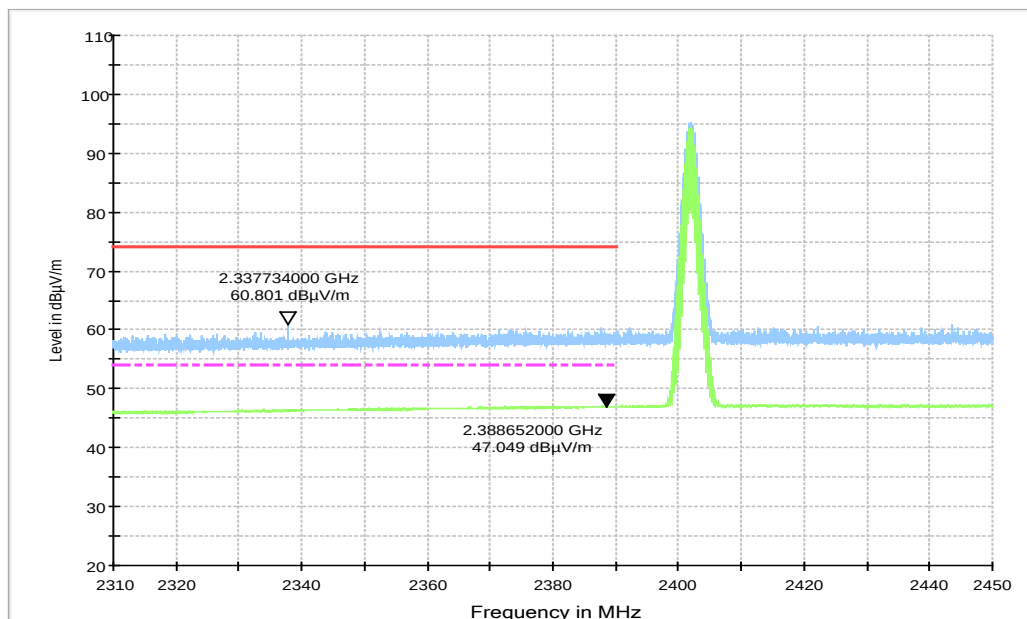


Fig.1. Frequency Band Edges: GFSK, Channel 0, 2.31 GHz – 2.45GHz

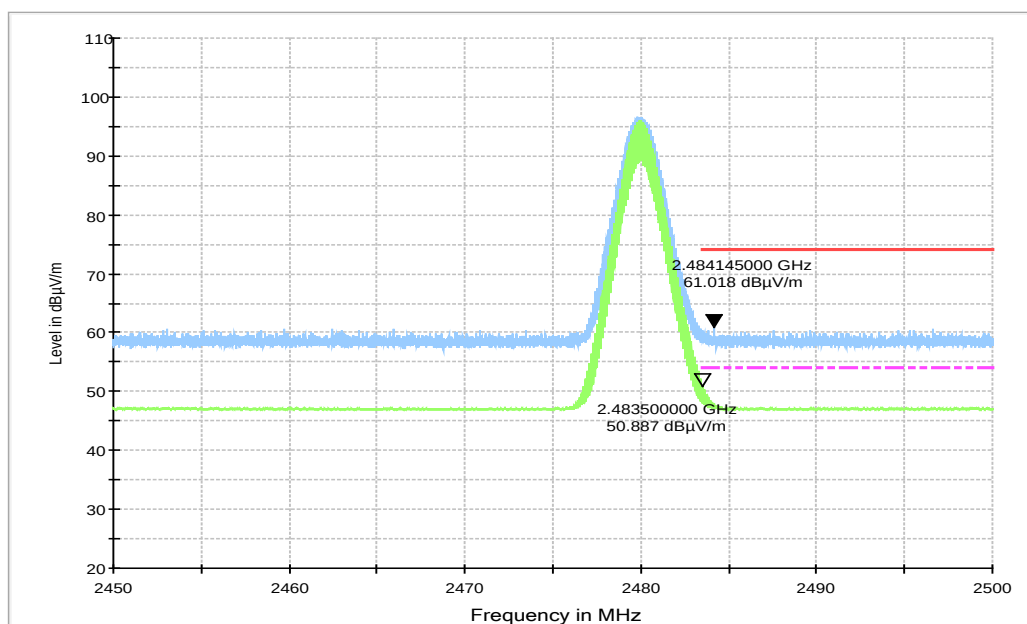


Fig.2. Frequency Band Edges: GFSK, Channel 78, ch11, 2.45 GHz - 2.50GHz

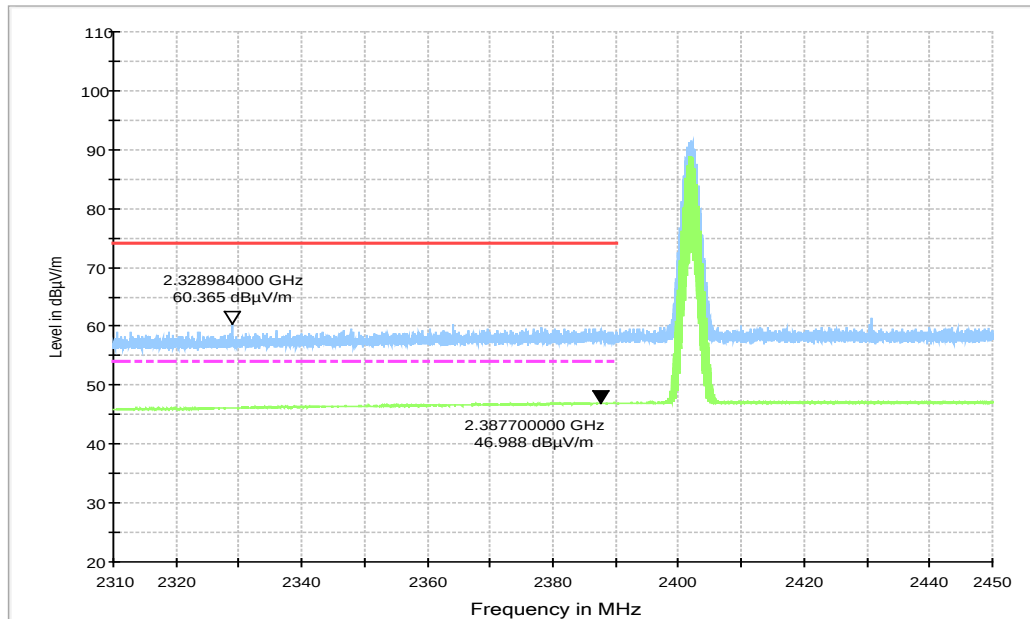


Fig.3. Frequency Band Edges: $\pi/4$ DQPSK, Channel 0, 2.31 GHz - 2.45GHz

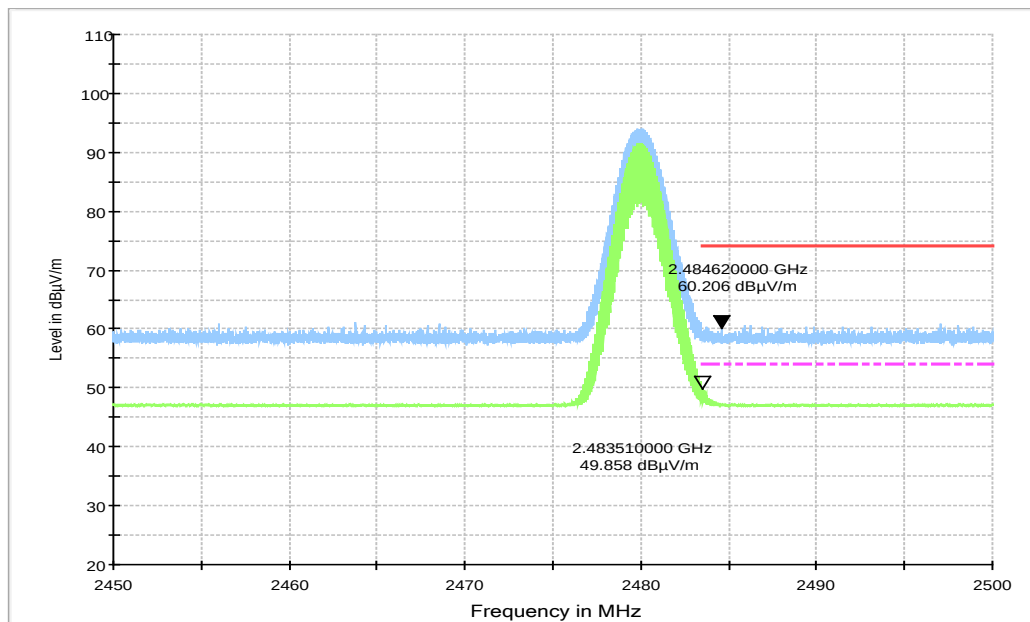


Fig.4. Frequency Band Edges: $\pi/4$ DQPSK, Channel 78, 2.45 GHz - 2.50GHz

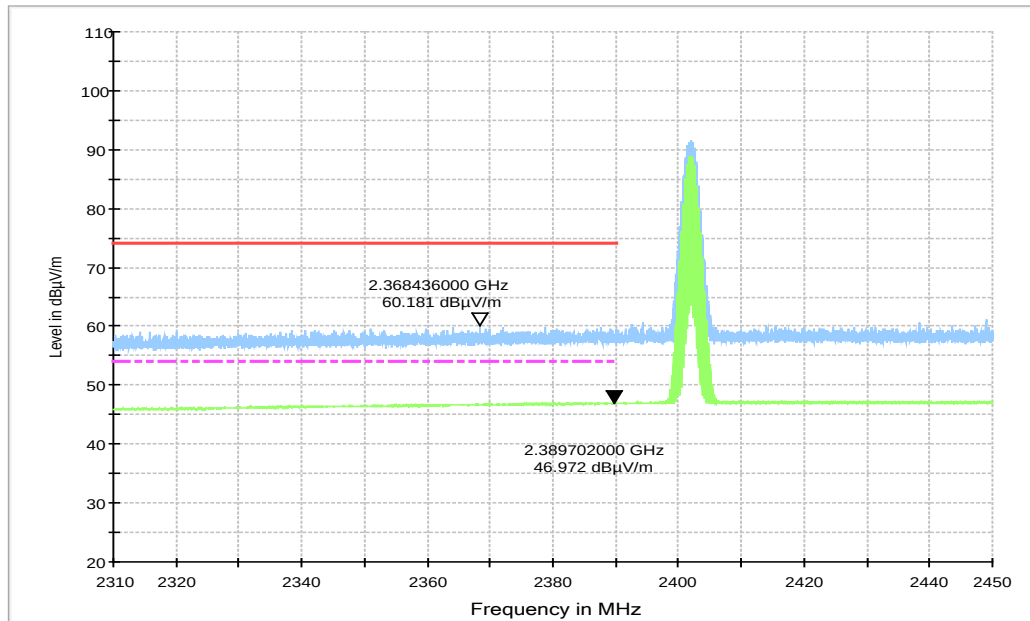


Fig.5. Frequency Band Edges: 8DPSK, Channel 0, 2.38 GHz - 2.45GHz

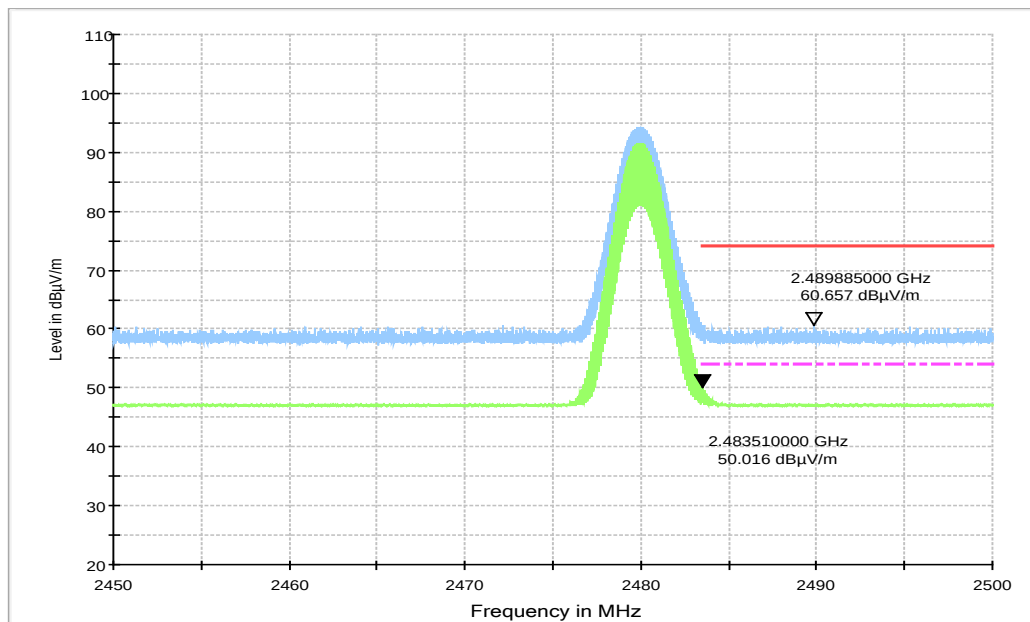


Fig.6. Frequency Band Edges: 8DPSK, Channel 78, 2.45 GHz - 2.50GHz

Inpaq

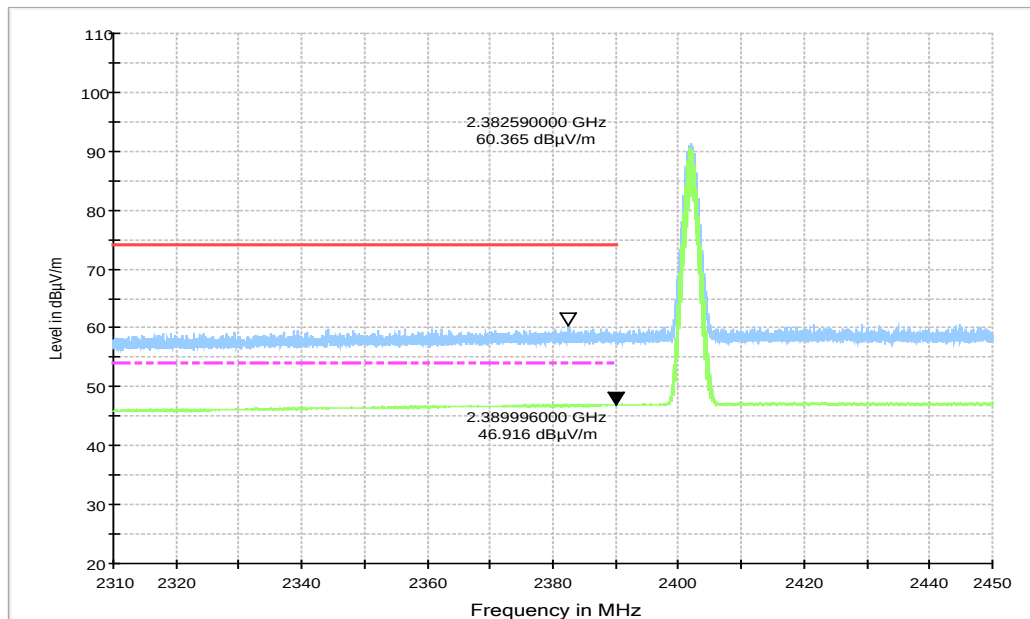


Fig.7. Frequency Band Edges: GFSK, Channel 0, 2.31 GHz – 2.45GHz

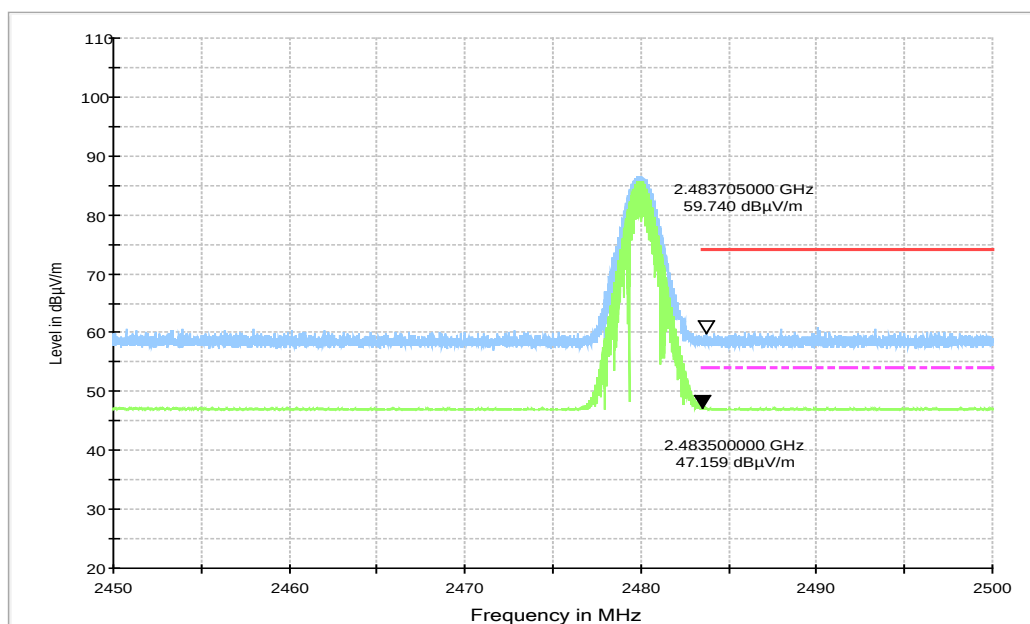


Fig.8. Frequency Band Edges: GFSK, Channel 78, ch11, 2.45 GHz - 2.50GHz

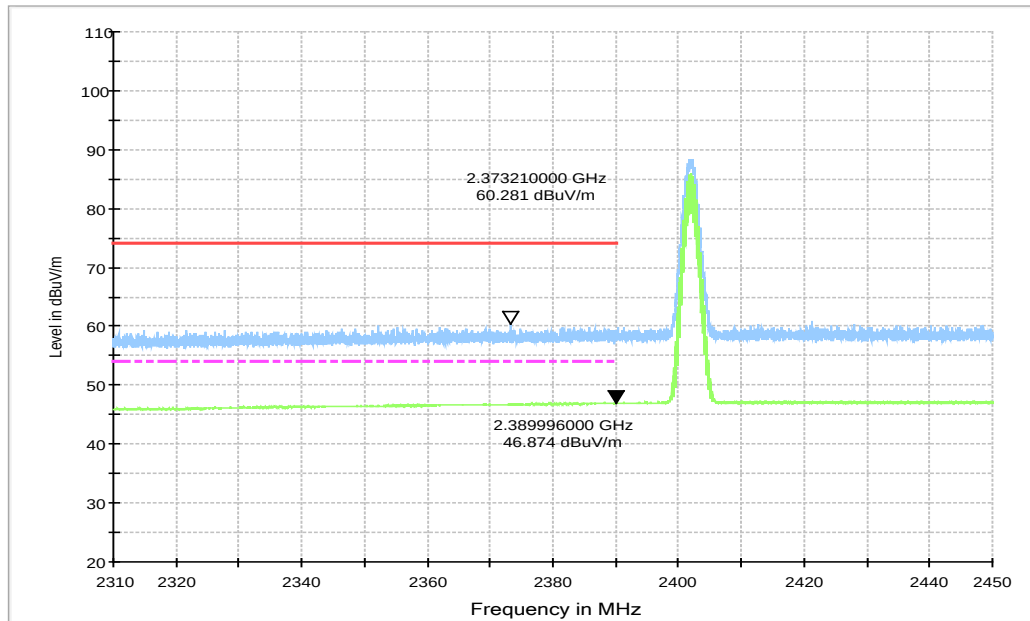


Fig.9. Frequency Band Edges: $\pi/4$ DQPSK, Channel 0, 2.31 GHz - 2.45GHz

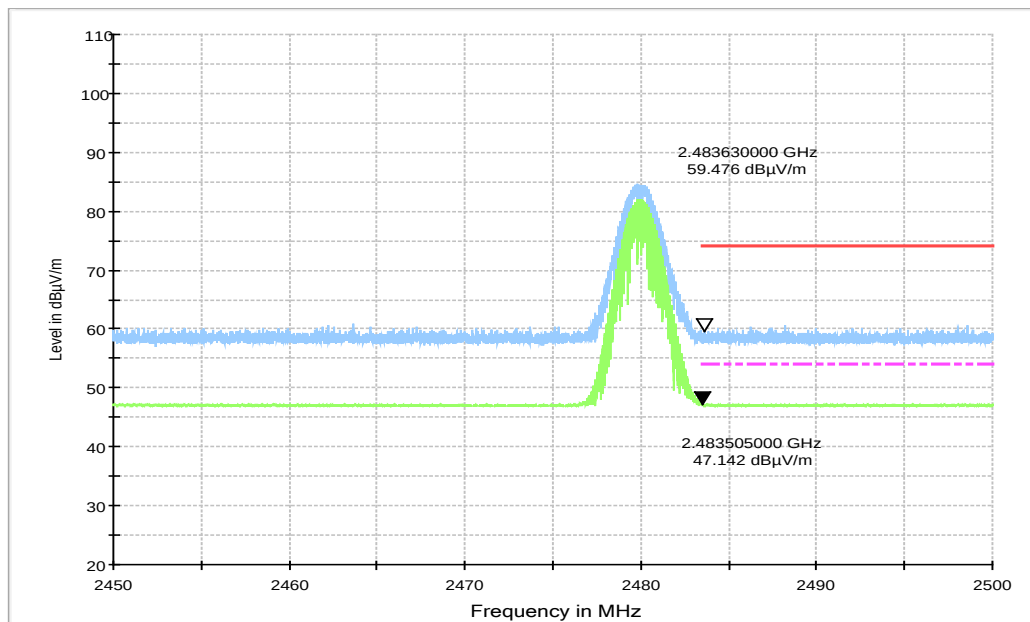


Fig.10. Frequency Band Edges: $\pi/4$ DQPSK, Channel 78, 2.45 GHz - 2.50GHz

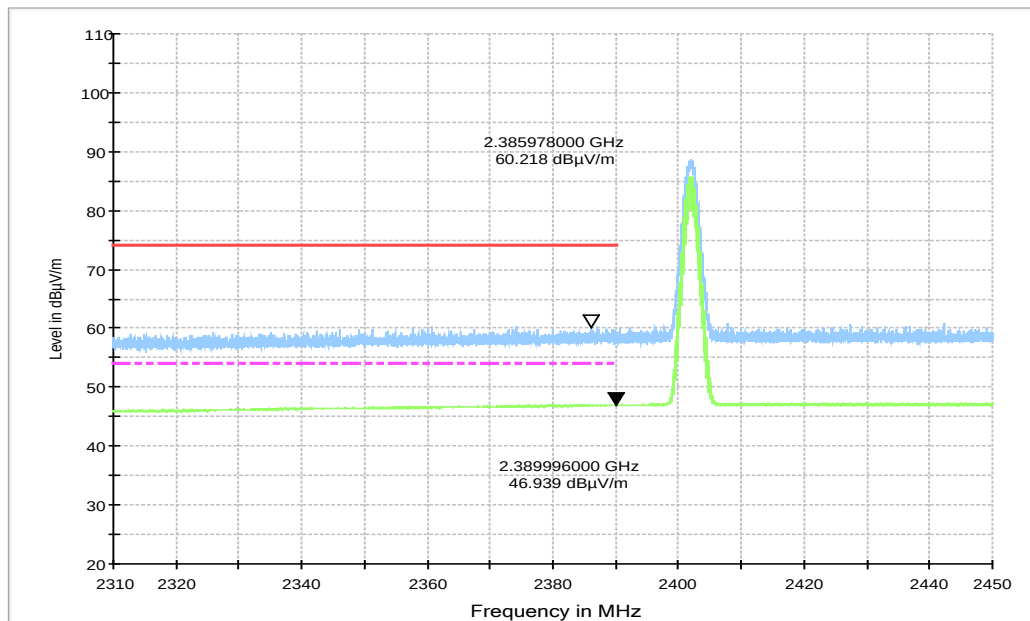


Fig.11. Frequency Band Edges: 8DPSK, Channel 0, 2.38 GHz - 2.45GHz

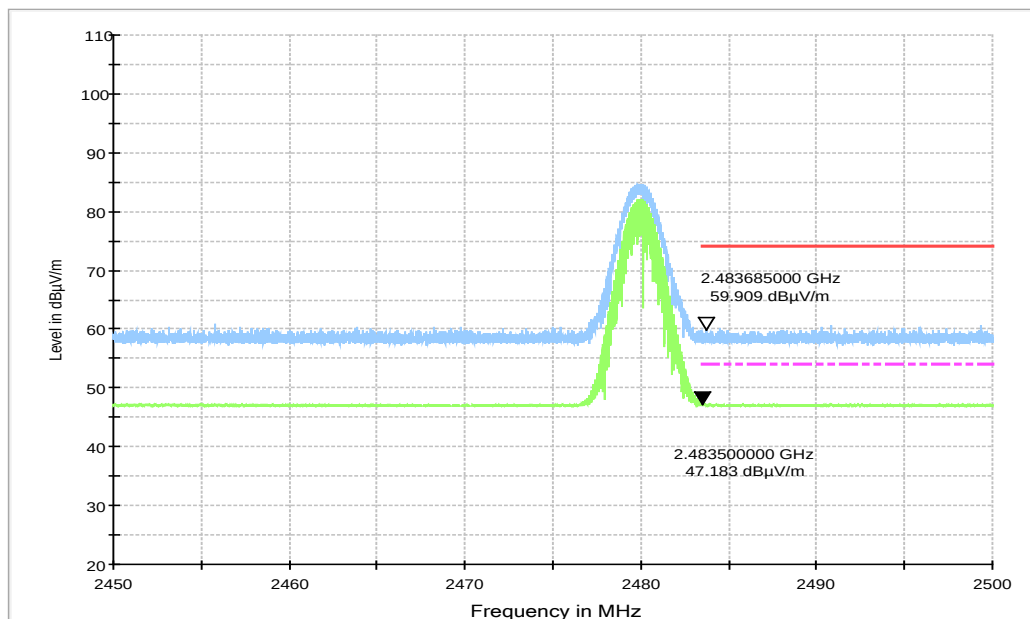


Fig.12. Frequency Band Edges: 8DPSK, Channel 78, 2.45 GHz - 2.50GHz

C.2. AC Powerline Conducted Emission

Specification Reference

FCC 47 CFR Part 15.207, 15.107& RSS-GEN, 8.8

Method of Measurement:

See Clause 6.2 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.

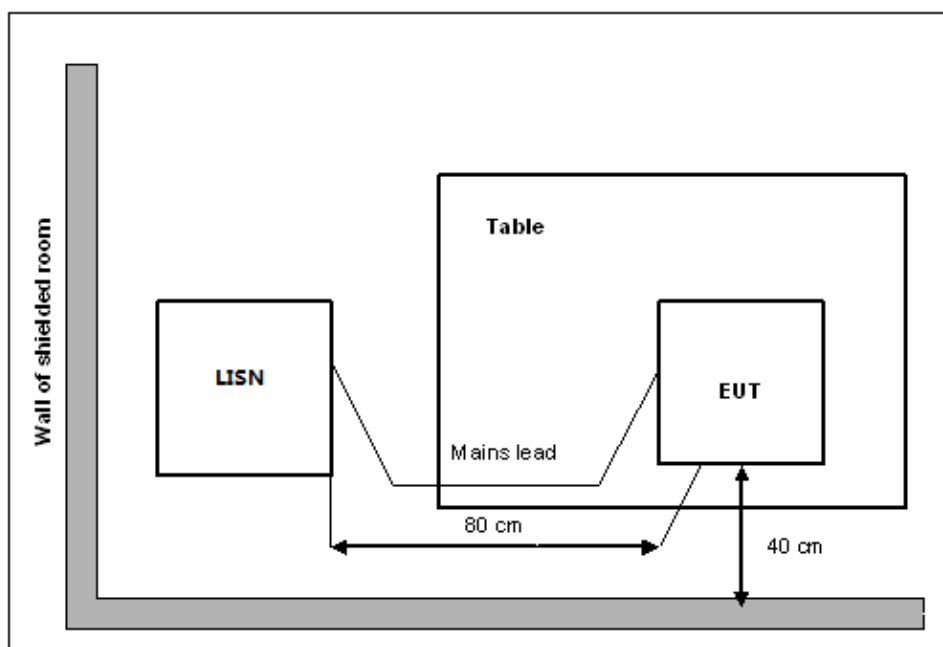
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
0.15-30	9kHz

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Setup



EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state.

The EUT is powered by an AC/travel adapter.

Measurement Result and limit:
Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	66 to 56	Fig.C.2.1	Fig.C.2.2	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Bluetooth (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	56 to 46	Fig.C.2.1	Fig.C.2.2	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Note: all modes have been tested and the worst results shown here.

Conclusion: Pass

Test graphs as below:

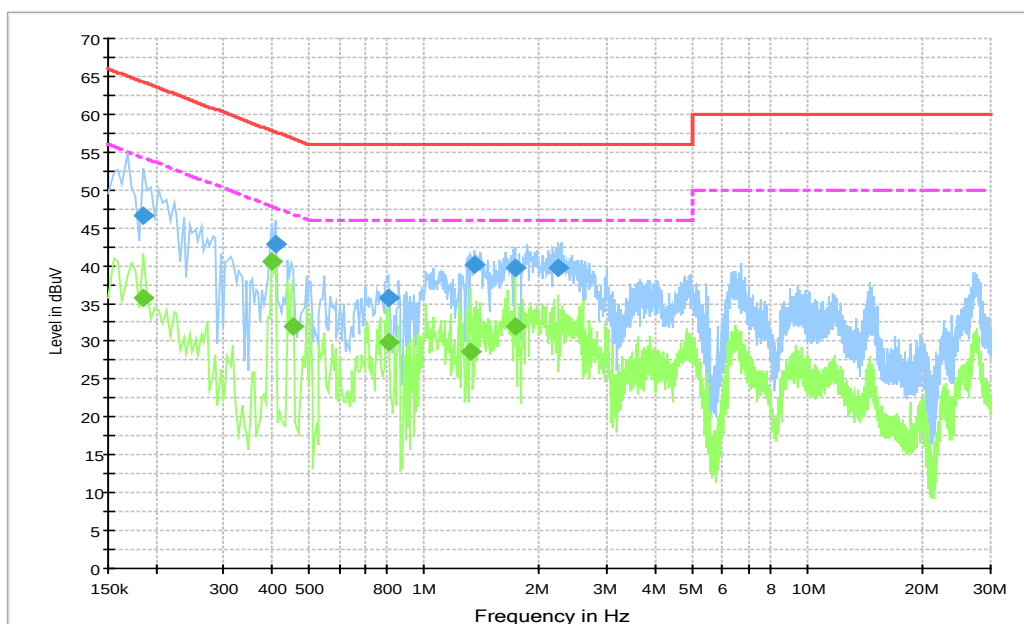


Fig.C.2.1 AC Powerline Conducted Emission- bluetooth

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.186000	46.6	1000.	9.000	N	20.0	17.7	64.2
0.411000	42.9	1000.	9.000	N	19.9	14.8	57.6
0.807000	35.6	1000.	9.000	L1	19.8	20.4	56.0
1.351500	40.0	1000.	9.000	L1	19.7	16.0	56.0
1.729500	39.8	1000.	9.000	L1	19.7	16.2	56.0
2.242500	39.7	1000.	9.000	L1	19.6	16.3	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.186000	35.8	1000.0	9.000	N	20.0	18.4	54.2
0.402000	40.5	1000.0	9.000	N	19.9	7.4	47.8
0.456000	31.9	1000.0	9.000	L1	19.9	14.9	46.8
0.807000	29.8	1000.0	9.000	L1	19.8	16.2	46.0
1.315500	28.6	1000.0	9.000	L1	19.7	17.4	46.0
1.725000	32.0	1000.0	9.000	L1	19.7	14.0	46.0

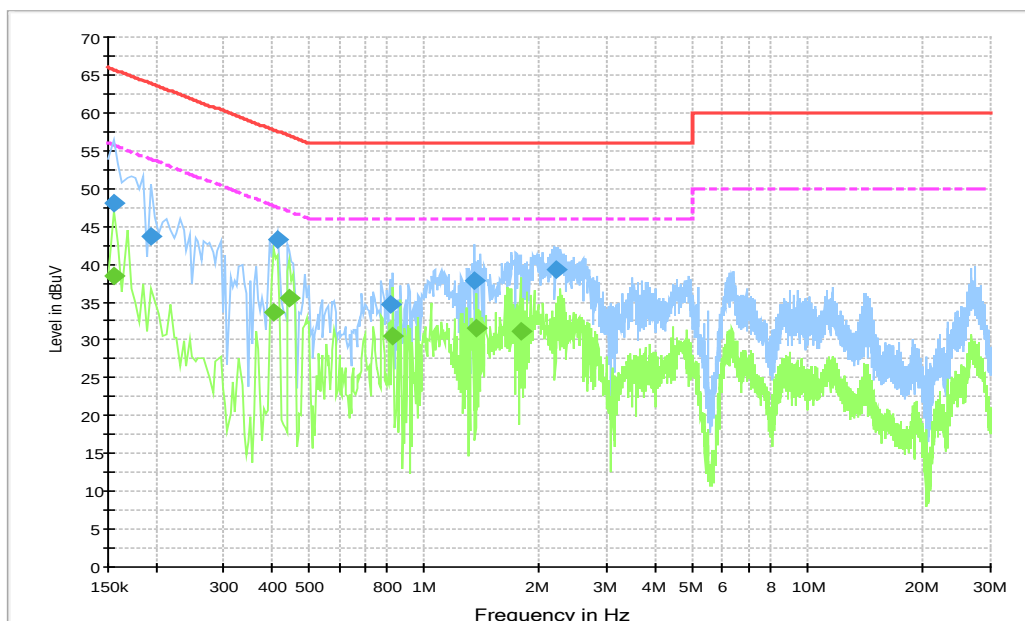


Fig.C.2.2 AC Powerline Conducted Emission-Idle

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	48.0	1000.	9.000	N	19.9	17.7	65.8
0.195000	43.7	1000.	9.000	N	19.9	20.1	63.8
0.415500	43.3	1000.	9.000	N	19.9	14.3	57.5
0.816000	34.7	1000.	9.000	L1	19.8	21.3	56.0
1.351500	37.9	1000.	9.000	L1	19.7	18.1	56.0
2.206500	39.3	1000.	9.000	L1	19.6	16.7	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	38.4	1000.0	9.000	N	19.9	17.3	55.8
0.406500	33.6	1000.0	9.000	L1	19.9	14.1	47.7
0.447000	35.6	1000.0	9.000	L1	19.9	11.4	46.9
0.829500	30.5	1000.0	9.000	L1	19.8	15.5	46.0
1.369500	31.5	1000.0	9.000	L1	19.7	14.5	46.0
1.783500	31.1	1000.0	9.000	L1	19.7	14.9	46.0

END OF REPORT