



FCC RADIO TEST REPORT

FCC ID : 2AJN7-TP00145D
Equipment : Notebook Computer
Brand Name : Lenovo
Model Name : TP00145D, TP00145E
Applicant : LC Future Center Limited Taiwan Branch
7F., No.780, Beian Rd., Zhongshan Dist., Taipei 104, Taiwan
Manufacturer : Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay,
Hong Kong, P.R. China
Standard : FCC 47 CFR Part 2, 96

Equipment: Rolling Wireless RW350R-GL tested inside of Lenovo Notebook Computer.

The product was received on Dec. 20, 2024 and testing was performed from Dec. 23, 2024 to Feb. 10, 2025. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Product Feature of Equipment Under Test	5
1.2 Product Specification of Equipment Under Test	6
1.3 Modification of EUT	6
1.4 Testing Location	7
1.5 Applied Standards	7
2 Test Configuration of Equipment Under Test	8
2.1 Test Mode.....	8
2.2 Connection Diagram of Test System	9
2.3 Support Unit used in test configuration	9
2.4 Frequency List of Low/Middle/High Channels.....	10
3 Conducted Test Items.....	11
3.1 Measuring Instruments.....	11
3.2 Conducted Output Power	12
3.3 EIRP	13
4 Radiated Test Items	14
4.1 Measuring Instruments.....	14
4.2 Test Setup	14
4.3 Test Result of Radiated Test.....	15
4.4 Radiated Spurious Emission	16
5 List of Measuring Equipment.....	17
6 Measurement Uncertainty	19
Appendix A. Test Results of Conducted Test	
Appendix B. Test Results of Radiated Test	
Appendix C. Test Setup Photographs	



History of this test report

Report No.	Version	Description	Issue Date
FG4D0659E	01	Initial issue of report	Mar. 03, 2025
FG4D0659E	02	Revise section 1.2, section 2.4, appendix A and appendix B This report is an updated version, replacing the report issued on Mar. 03, 2025.	Mar. 31, 2025

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Pass	-
-	§96.41	Peak-to-Average Ratio	Pass	See Note
3.3	§96.41	Effective Isotropic Radiated Power and EIRP PSD	Pass	-
-	§2.1049 §96.41	Occupied Bandwidth	Pass	See Note
-	§2.1051 §96.41	Conducted Band Edge Measurement	Pass	See Note
-	§2.1051 §96.41	Conducted Spurious Emission	Pass	See Note
-	§2.1055	Frequency Stability for Temperature & Voltage	Pass	See Note
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	-
Note: 1. For host device, Radiated Spurious Emission and Equivalent Isotropic Radiated Power are verified and complies with the limit in this test report. 2. For host device, the Conducted Output Power is no difference after compared to module (Model: RW350R-GL)				

Conformity Assessment Condition:

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

Disclaimer:

- The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.
- The purpose of different model name is for marketing segmentation.

Reviewed by: Sheng Kuo
Report Producer: Michelle Chen

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Notebook Computer
Brand Name	Lenovo
Model Name	TP00145D, TP00145E
FCC ID	2AJN7-TP00145D
Sample 1	EUT with Amphenol Taiwan Corporation Antenna
Sample 2	EUT with Speed Antenna
Integrated WLAN Module	Brand Name: Intel Model Name: AX211D2W FCC ID: PD9AX211D2
Integrated WLAN Module	Brand Name: Intel Model Name: BE201D2W FCC ID: PD9BE201D2
Integrated NFC Module	Brand Name: Foxconn Model Name: T77H747 FCC ID: MCLT77H747
EUT supports Radios application	WCDMA/HSPA/LTE/5G NR/GNSS/NFC WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80/VHT160 WLAN 11ax HE20/HE40/HE80/HE160 WLAN 11be EHT20/ EHT40/EHT80/EHT160/EHT320 Bluetooth BR/EDR/LE
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer.
2. Equipment: Rolling Wireless RW350R-GL tested inside of Lenovo Notebook Computer.
3. All the tests were performed with TP00145D.

Support band and evaluated information	
Supported band	n48
Evaluated and Tested band	n48
Main Antenna	n48
MIMO2 Antenna	n48

WWAN Antenna Information				
Main Antenna	Manufacturer	Amphenol Taiwan Corporation	Peak gain (dBi)	5GNR n48 : 0.92
	Part number	DC330025X30	Type	PIFA
	Manufacturer	Speed	Peak gain (dBi)	5GNR n48 : 0.92
	Part number	DC330025Y30	Type	PIFA
MIMO2 Antenna	Manufacturer	Amphenol Taiwan Corporation	Peak gain (dBi)	5GNR n48 : 0.73
	Part number	DC330025X40	Type	PIFA
	Manufacturer	Speed	Peak gain (dBi)	5GNR n48 : 0.73
	Part number	DC330025Y40	Type	PIFA

Remark: The above EUT's information was declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Tx Frequency	3550 MHz ~ 3700 MHz
Rx Frequency	3550 MHz ~ 3700 MHz
Bandwidth	SCS 15kHz: 5MHz / 10MHz / 15MHz / 20MHz / 30MHz / 40MHz SCS 30kHz: 10MHz / 15MHz / 20MHz / 30MHz / 40MHz
Maximum Output Power to Antenna	<SCS 15k>: <MIMO2 Antenna>: 20.98 dBm <SCS 30k> <Main Antenna>: 20.57 dBm <MIMO2 Antenna>: 21.06 dBm
Type of Modulation	PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

1.3 Modification of EUT

No modifications are made to the EUT during all test items.

1.4 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333
Test Site No.	Sporton Site No. TH03-HY
Test Engineer	Mike Yeh
Temperature (°C)	21.8~23.9
Relative Humidity (%)	51.8~58.9

Test Site	Sporton International Inc. Wensan Laboratory.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010
Test Site No.	Sporton Site No. 03CH16-HY (TAF Code: 3786)
Test Engineer	Jerry Lan, Gary Guo and Steven Wu
Temperature (°C)	19.1~22.3
Relative Humidity (%)	62.5~68.3
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ ANSI C63.26-2015
- ♦ FCC 47 CFR Part 2, 96
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 940660 D01 Part 96 CBRS Eqpt v03
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

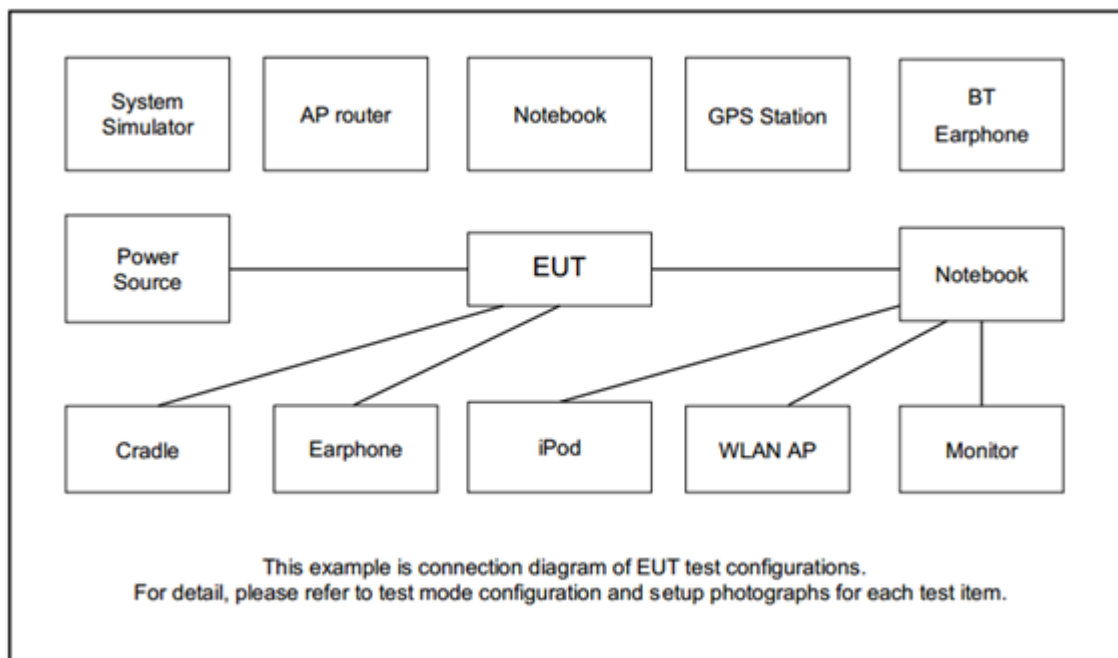
Modulation Type	Modulation	Modulation Type	Modulation
A	DFT-s-OFDM pi/2 BPSK	N/A	N/A
B	DFT-s-OFDM QPSK	F	CP-OFDM QPSK
C	DFT-s-OFDM 16QAM	G	CP-OFDM 16QAM
D	DFT-s-OFDM 64QAM	H	CP-OFDM 64QAM
E	DFT-s-OFDM 256QAM	I	CP-OFDM 256QAM

Test Item	Modulation Type	Bandwidth	RB Size	Channel
Conducted Power	A, B, C	All	1RB	L, M, H
EIRP	A, B, C	All	1RB	L, M, H
RSE	A, F	40 MHz or less	Inner_1RB	L, M, H

Remark:

1. Evaluated all the transmitter signal and reporting worst-case configuration among all modulation types.
2. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst-case emissions are reported.
3. During the RSE preliminary test, the standalone mode and charging modes were verified. It is determined that the charging modes is the worst case for the official test.
4. For modulation of Pi/2 BPSK & QPSK & 16QAM, the maximum power of Pi/2 BPSK & QPSK & 16QAM is higher than other modulation(64QAM/256QAM), therefore, according to engineering evaluation, we choose higher power (Pi/2 BPSK & QPSK & 16QAM) to perform tests and show in the report.
5. 5GNR n48 supports antenna Main & antenna MIMO2, this report only presents the worst case for radiated spurious emission.
6. Since n48 mainly uses MIMO2 antennas for testing, the Main antenna acts as the secondary antenna. Therefore, the Main antenna is only used to measure pi/2 BPSK, QPSK, and 16QAM at the maximum bandwidth. For other bandwidths, only pi/2 BPSK is measured.
7. For 5G NR UL CA combination is EN-DC B2+n48.
8. All the radiated test cases were performed with Sample 2 and Battery 1.

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m
3.	Earphone	UGREEN	N/A	N/A	N/A	Shielded, 1.5m

2.4 Frequency List of Low/Middle/High Channels

NR Band n48 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	638000	641666	645332
	Frequency	3570.0	3624.99	3679.98
30	Channel	637668	641666	645666
	Frequency	3565.02	3624.99	3684.99
20	Channel	637334	641666	646000
	Frequency	3560.01	3624.99	3690.0
15	Channel	637168	641666	646166
	Frequency	3557.52	3624.99	3692.49
10	Channel	637000	641666	646332
	Frequency	3555.0	3624.99	3694.98
5	Channel	636834	641666	646500
	Frequency	3552.51	3624.99	3697.5

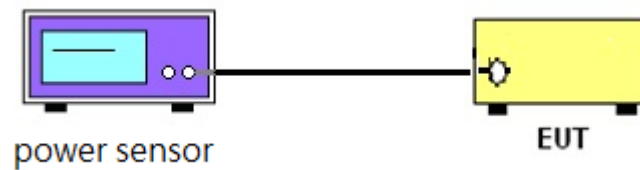
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power

3.2.1 Description of the Conducted Output Power Measurement

A power sensor was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.2.2 Test Procedures

1. The transmitter output port was connected to the power sensor.
 2. Set EUT at maximum power.
 3. Select lowest, middle, and highest channels for each band and different modulation.
 4. Measure and record the power level from the power sensor
 5. The measure-and-sum technique is used for measuring in-band transmit power of a device.
- Total power is the sum of the conducted power levels measured at the various output ports.

3.3 EIRP

3.3.1 Description of the EIRP Measurement

The EIRP of category A CBSD must not exceed 30 dBm / 10 megahertz.

The EIRP PSD of category A CBSD must not exceed 20 dBm / 1 megahertz.

The testing follows ANSI C63.26-2015 Section 5.2.5.5

According to KDB 412172 D01 Power Approach,

$EIRP = PT + GT - LC$, where

PT = transmitter output power in dBm

GT = gain of the transmitting antenna in dBi

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

Device	Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a

3.3.2 Test Procedures

1. The testing follows procedure in Section 5.2 of ANSI C63.26-2015 and KDB 940660 D01 Part 96 CBRS Eqpt v03 Section 3.2(b)(2) and 3.2(b)(3)
2. Determine the EIRP by adding the effective antenna gain to the measured average conducted power level.
3. The MIMO mode is completely uncorrelated, so the directional gain is selected the maximum gain among all antennas.

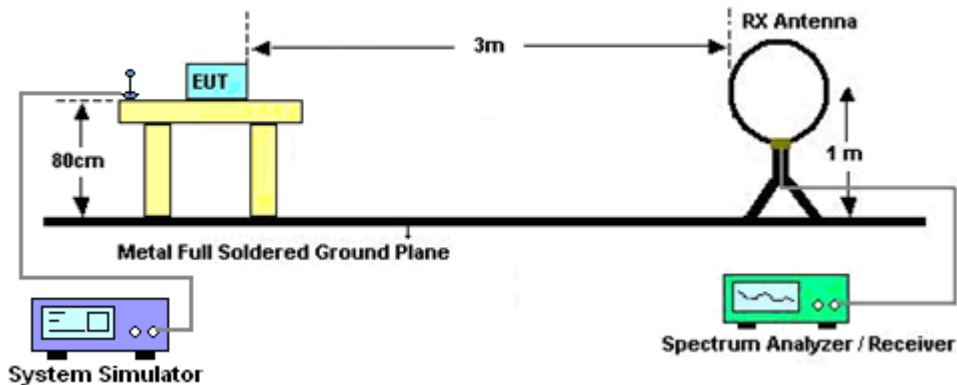
4 Radiated Test Items

4.1 Measuring Instruments

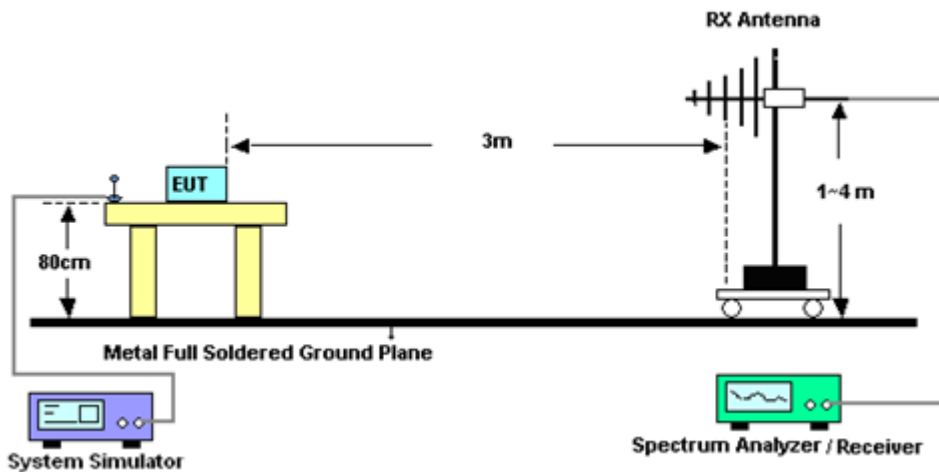
See list of measuring instruments of this test report.

4.2 Test Setup

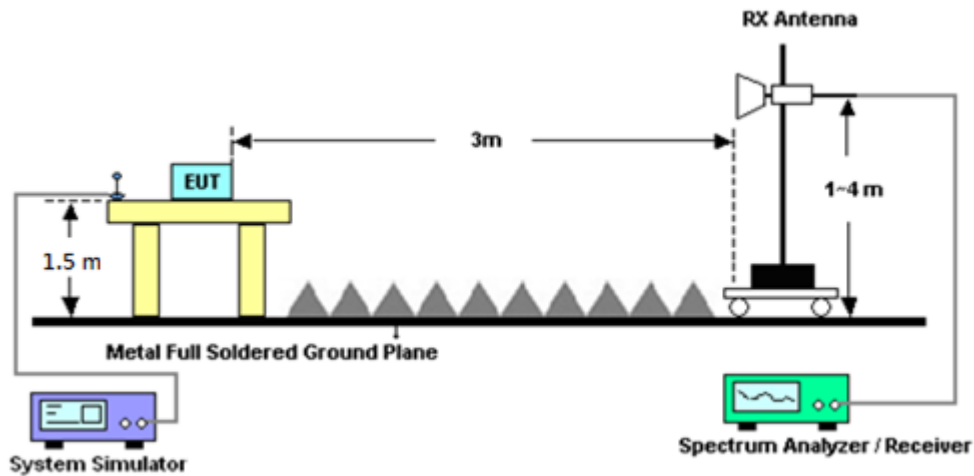
For radiated emissions below 30MHz



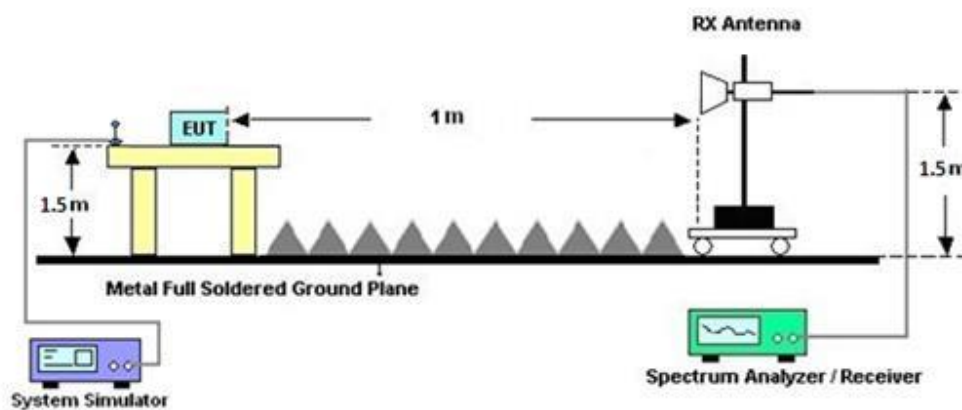
For radiated emissions from 30MHz to 1GHz



For radiated emissions from 1GHz to 18GHz



For radiated emissions above 18GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26-2015.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz .

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI C63.26-2015 section 5.5.4 Radiated measurement using the field strength method.

1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. To convert spectrum reading E(dBuV/m) to EIRP(dBm)
$$\text{EIRP(dBm)} = \text{Level (dBuV/m)} + 20\log(d) - 104.77$$
, where d is the distance at which field strength limit is specified in the rules.
7.
$$\text{Field Strength Level (dBm)} = \text{Spectrum Reading (dBm)} + \text{Antenna Factor} + \text{Cable Loss} + \text{Read Level} - \text{Preamp Factor}.$$
8.
$$\text{ERP (dBm)} = \text{EIRP (dBm)} - 2.15$$
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.



5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Feb. 23, 2024	Jan. 11, 2025~ Feb. 05, 2025	Feb. 22, 2025	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	1223	18GHz~40GHz	Jun. 24, 2024	Jan. 11, 2025~ Feb. 05, 2025	Jun. 23, 2025	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Nov. 22, 2024	Jan. 11, 2025~ Feb. 05, 2025	Nov. 21, 2025	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01N-06	47020 & 06	30MHz to 1GHz	Oct. 05, 2024	Jan. 11, 2025~ Feb. 05, 2025	Oct. 04, 2025	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1G~18GHz	Mar. 28, 2024	Jan. 11, 2025~ Feb. 05, 2025	Mar. 27, 2025	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1GHz	Jul. 02, 2024	Jan. 11, 2025~ Feb. 05, 2025	Jul. 01, 2025	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 05, 2024	Jan. 11, 2025~ Feb. 05, 2025	Dec. 04, 2025	Radiation (03CH16-HY)
Preamplifier	EMEC	EM1G18G	060812	1GHz~18GHz	Dec. 24, 2024	Jan. 11, 2025~ Feb. 05, 2025	Dec. 23, 2025	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	May 27, 2024	Jan. 11, 2025~ Feb. 05, 2025	May 26, 2025	Radiation (03CH16-HY)
Filter	Wainwright	WLK4-1000-1530- 8000-40SS	SN17	1.53GHz Low Pass Filter	Jan. 15, 2024	Jan. 11, 2025~ Jan. 13, 2025	Jan. 14, 2025	Radiation (03CH16-HY)
Filter	Wainwright	WLK4-1000-1530- 8000-40SS	SN17	1.53GHz Low Pass Filter	Jan. 14, 2025	Jan. 14, 2025~ Feb. 05, 2025	Jan. 13, 2026	Radiation (03CH16-HY)
Filter	Wainwright	WHKX12-2700-30 00-18000-60ST	SN3	3GHz High Pass Filter	Jun. 28, 2024	Jan. 11, 2025~ Feb. 05, 2025	Jun. 27, 2025	Radiation (03CH16-HY)
Filter	Wainwright	WHKX8-5872.5-6 750-18000-40ST	SN27	6.75GHz High Pass Filter	Dec. 26, 2024	Jan. 11, 2025~ Feb. 05, 2025	Dec. 25, 2025	Radiation (03CH16-HY)
Filter	Wainwright	WRCD1710-1980- 10-40-10SSK	SN2	1710-1980	Aug. 17, 2024	Jan. 11, 2025~ Feb. 05, 2025	Aug. 16, 2025	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 06, 2024	Jan. 11, 2025~ Feb. 05, 2025	Mar. 05, 2025	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102/SUCOFLEX 104	EC-A5-300-57 57,805935/4,8 02434/4	30MHz~18GHz	Aug. 07, 2024	Jan. 11, 2025~ Feb. 05, 2025	Aug. 06, 2025	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804011/2,804 012/2	18-40GHz	Dec. 31, 2024	Jan. 11, 2025~ Feb. 05, 2025	Dec. 30, 2025	Radiation (03CH16-HY)
Software	Audix	E3 230621 V9	RK-002393	N/A	N/A	Jan. 11, 2025~ Feb. 05, 2025	N/A	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Jan. 11, 2025~ Feb. 05, 2025	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jan. 11, 2025~ Feb. 05, 2025	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jan. 11, 2025~ Feb. 05, 2025	N/A	Radiation (03CH16-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
DC Power Supply	GW Instek	GPE2323	GET910896	0V~64V ;0A~6A	Nov. 26, 2024	Dec. 23, 2024~ Feb. 10, 2025	Nov. 25, 2025	Conducted (TH03-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101544	10Hz~44GHz	Jul. 17, 2024	Dec. 23, 2024~ Feb. 10, 2025	Jul. 16, 2025	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SU-641	92013721	-30°C ~70°C	Oct. 08, 2024	Dec. 23, 2024~ Feb. 10, 2025	Oct. 07, 2025	Conducted (TH03-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	NA	Nov. 01, 2024	Dec. 23, 2024~ Feb. 10, 2025	Oct. 31, 2025	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8821C	6261849015	LTE	Nov. 26, 2024	Dec. 23, 2024~ Feb. 10, 2025	Nov. 25, 2025	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8000A	6261940327	FR1	Nov. 28, 2024	Dec. 23, 2024~ Feb. 10, 2025	Nov. 27, 2025	Conducted (TH03-HY)
Coupler	MVE	MVE-4816-10	A400024	N/A	Jun. 27, 2024	Dec. 23, 2024~ Feb. 10, 2025	Jun. 26, 2025	Conducted (TH03-HY)
Power divider	Anritsu	K241C	2143398	9KHz~40GHz	Jun. 13, 2024	Dec. 23, 2024~ Feb. 10, 2025	Jun. 12, 2025	Conducted (TH03-HY)
RF Cable	MVE	MCBL-LL403P.50	E80002C	9KHz~40GHz	Aug. 23, 2024	Dec. 23, 2024~ Feb. 10, 2025	Aug. 22, 2025	Conducted (TH03-HY)
Software 1	Sporton	FCC 5GNR_FSV3044_ 20231106	N/A	Conducted Test Item	N/A	Dec. 23, 2024~ Feb. 10, 2025	N/A	Conducted (TH03-HY)

6 Measurement Uncertainty

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.5 dB
---	--------

Uncertainty of Radiated Emission Measurement (1 GHz ~ 6 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9 dB
---	--------

Uncertainty of Radiated Emission Measurement (6 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1 dB
---	--------

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.3 dB
---	--------



Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power) and ERP/EIRP

<SCS 15k>

<MIMO2 Antenna>

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
5	1	1	PI/2 BPSK	20.82	20.84	20.57	21.57	0.1435
5	1	1	QPSK	20.58	20.62	20.66		
5	1	1	16-QAM	19.90	20.01	19.81	20.74	0.1186
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	20.72	20.87	20.69	21.63	0.1455
10	1	1	QPSK	20.75	20.90	20.77		
10	1	1	16-QAM	19.83	19.99	19.84	20.72	0.1180
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
15	1	1	PI/2 BPSK	20.85	20.86	20.54	21.71	0.1483
15	1	1	QPSK	20.89	20.98	20.79		
15	1	1	16-QAM	19.90	20.01	19.81	20.74	0.1186
Limit	EIRP < 23dBm/10MHz			Result			Pass	

Total EIRP power is less than partial EIRP limit 23 dBm/10MHz.



NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	20.81	20.93	20.66	21.68	0.1472
20	1	1	QPSK	20.90	20.95	20.72		
20	1	1	16-QAM	19.94	20.04	19.78	20.77	0.1194
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
30	1	1	PI/2 BPSK	20.67	20.86	20.55	21.62	0.1452
30	1	1	QPSK	20.69	20.89	20.58		
30	1	1	16-QAM	19.79	19.95	19.65	20.68	0.1169
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
40	1	1	PI/2 BPSK	20.43	20.64	20.25	21.39	0.1377
40	1	1	QPSK	20.45	20.66	20.32		
40	1	1	16-QAM	19.50	19.66	19.37	20.39	0.1094
Limit	EIRP < 23dBm/10MHz			Result			Pass	

Total EIRP power is less than partial EIRP limit 23 dBm/10MHz.

**<SCS 30k>****<Main Antenna>**

NR n48 Maximum Average Power [dBm] (GT - LC = 0.92 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	20.47	20.34	20.01	21.39	0.1377
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.92 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
15	1	1	PI/2 BPSK	20.43	20.39	20.06	21.35	0.1365
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.92 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	20.40	20.37	20.08	21.32	0.1355
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.92 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
30	1	1	PI/2 BPSK	20.39	20.37	20.00	21.31	0.1352
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.92 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
40	1	1	PI/2 BPSK	20.57	20.53	20.18	21.49	0.1409
40	1	1	QPSK	20.57	20.46	20.17		
40	1	1	16-QAM	19.45	19.42	19.16	20.37	0.1089
Limit	EIRP < 23dBm/10MHz			Result			Pass	

Total EIRP power is less than partial EIRP limit 23 dBm/10MHz.



<MIMO2 Antenna>

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	20.89	21.04	20.77	21.79	0.1510
10	1	1	QPSK	20.95	21.06	20.79		
10	1	1	16-QAM	19.88	20.05	19.77	20.78	0.1197
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
15	1	1	PI/2 BPSK	20.87	20.99	20.63	21.72	0.1486
15	1	1	QPSK	20.87	20.98	20.67		
15	1	1	16-QAM	19.76	19.89	19.53	20.62	0.1153
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	20.90	20.95	20.55	21.7	0.1479
20	1	1	QPSK	20.87	20.97	20.57		
20	1	1	16-QAM	19.91	19.96	19.54	20.69	0.1172
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
30	1	1	PI/2 BPSK	20.77	20.91	20.48	21.64	0.1459
30	1	1	QPSK	20.76	20.91	20.50		
30	1	1	16-QAM	19.65	19.81	19.41	20.54	0.1132
Limit	EIRP < 23dBm/10MHz			Result			Pass	

NR n48 Maximum Average Power [dBm] (GT - LC = 0.73 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
40	1	1	PI/2 BPSK	20.56	20.73	20.25	21.5	0.1413
40	1	1	QPSK	20.59	20.77	20.28		
40	1	1	16-QAM	19.52	19.68	19.25	20.41	0.1099
Limit	EIRP < 23dBm/10MHz			Result			Pass	

Total EIRP power is less than partial EIRP limit 23 dBm/10MHz.



Appendix B. Test Results of Radiated Test

B1. Summary of each worse mode

Mode	Part	Band	Ch	Freq (MHz)	Level (dBm)	Det	Ant Factor (dB)	AmplCbl (dB)	Filter (dB)	EIRPCF (dB)	Reading (dBuV)	Limit (dBm)	Margin (dB)	Pol	Ant
58	Part 96 NR	NR SA n48	H	7324	-46.66	RMS	36.76	-52.46	1.07	-95.23	63.20	-40.00	-6.66	V	MIMO2
59	Part 96 NR	EN-DC B2+n48	H	7324	-43.26	RMS	36.76	-52.46	1.07	-95.23	66.60	-40.00	-3.26	V	LTE : MIMO2 5G NR : Main

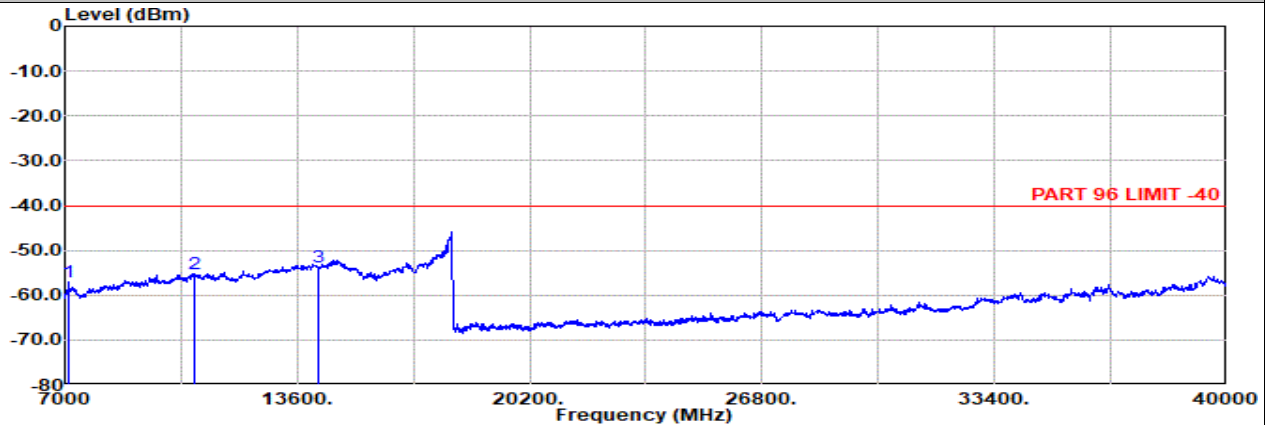


Ant MIMO2

Part 96 NR Mode 58

NR SA n48 40M Ch638000 1RB1 BPSK

L

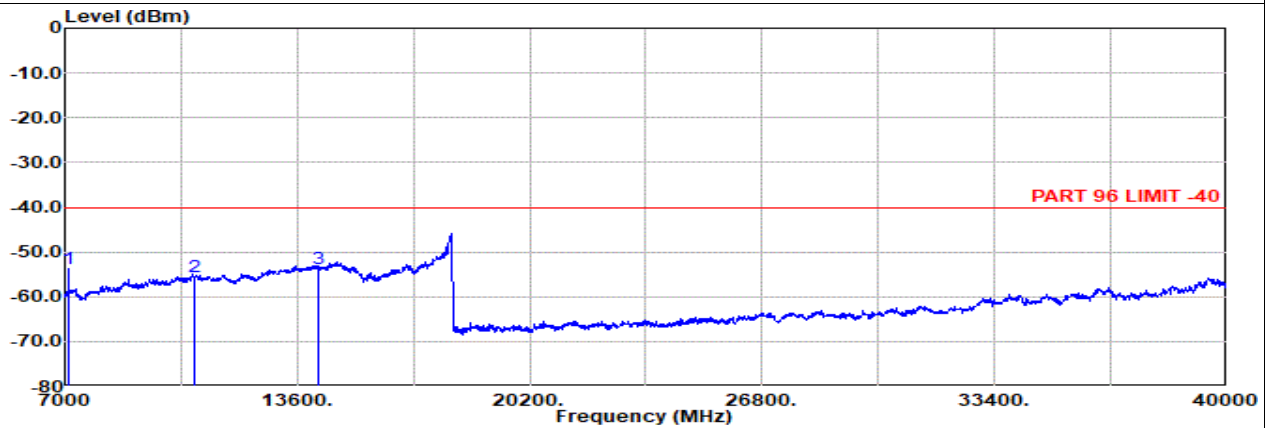


Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Horizontal

: SA n48 40M Ch638000 1RB1 BPSK

	Freq MHz	Level dBm	Detector	Ant Amp\Cb Filter		EIRPCF	Readin g	Limit		Margin	Pol
				Factor	1						
1	7104.00	-57.18	RMS	36.32	-52.63	1.25	-95.23	53.11	-40.00	-17.18	Horizontal
2	10656.00	-55.37	RMS	39.09	-50.13	0.70	-95.23	50.20	-40.00	-15.37	Horizontal
3	14209.00	-53.72	RMS	40.90	-47.08	0.65	-95.23	47.04	-40.00	-13.72	Horizontal



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Vertical

: SA n48 40M Ch638000 1RB1 BPSK

	Freq MHz	Level dBm	Detector	Ant Amp\Cb Filter		EIRPCF	Readin g	Limit		Margin	Pol
				Factor	1						
1	7104.00	-53.77	RMS	36.32	-52.63	1.25	-95.23	56.52	-40.00	-13.77	Vertical
2	10656.00	-55.45	RMS	39.09	-50.13	0.70	-95.23	50.12	-40.00	-15.45	Vertical
3	14209.00	-53.66	RMS	40.90	-47.08	0.65	-95.23	47.10	-40.00	-13.66	Vertical

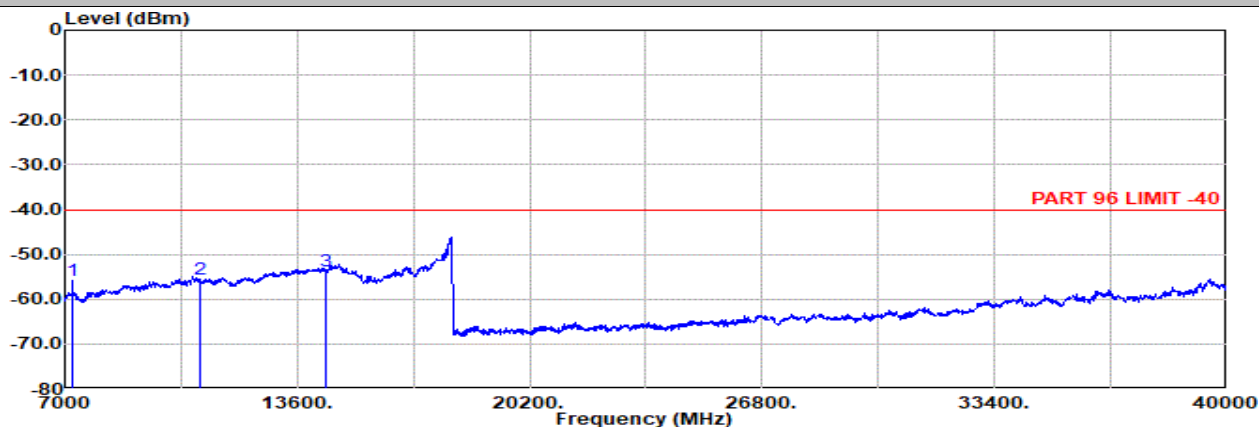


Ant MIMO2

Part 96 NR Mode 58

NR SA n48 40M Ch641666 1RB1 BPSK

M

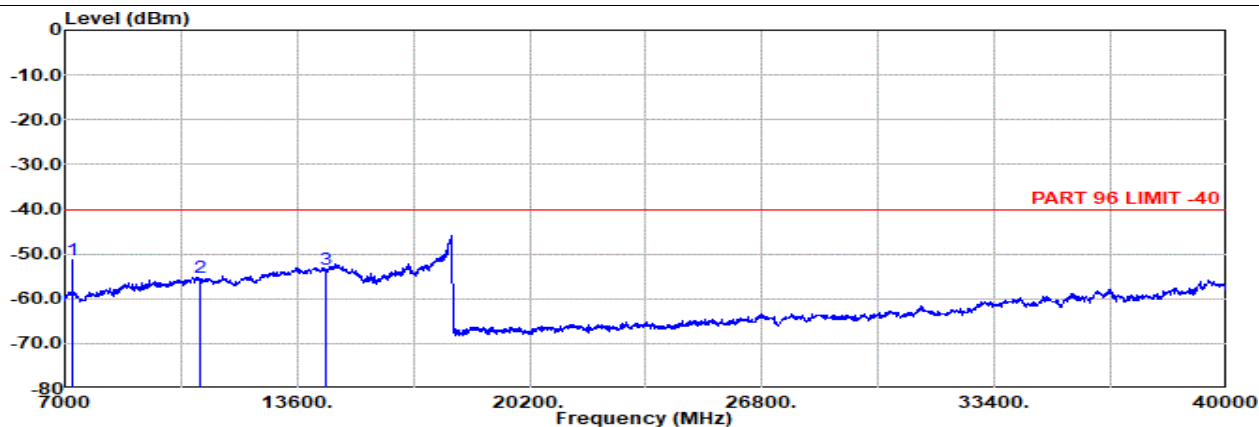


Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Horizontal

: SA n48 40M Ch641666 1RB1 BPSK

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm								
1	7214.00	-55.86	RMS	36.86	-52.53	1.15	-95.23	53.89	-40.00	-15.86 Horizontal
2	10821.00	-55.48	RMS	39.02	-49.73	0.68	-95.23	49.78	-40.00	-15.48 Horizontal
3	14429.00	-53.63	RMS	40.54	-46.90	0.65	-95.23	47.31	-40.00	-13.63 Horizontal



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Vertical

: SA n48 40M Ch641666 1RB1 BPSK

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm								
1	7214.00	-51.45	RMS	36.86	-52.53	1.15	-95.23	58.30	-40.00	-11.45 Vertical
2	10821.00	-55.33	RMS	39.02	-49.73	0.68	-95.23	49.93	-40.00	-15.33 Vertical
3	14429.00	-53.50	RMS	40.54	-46.90	0.65	-95.23	47.44	-40.00	-13.50 Vertical

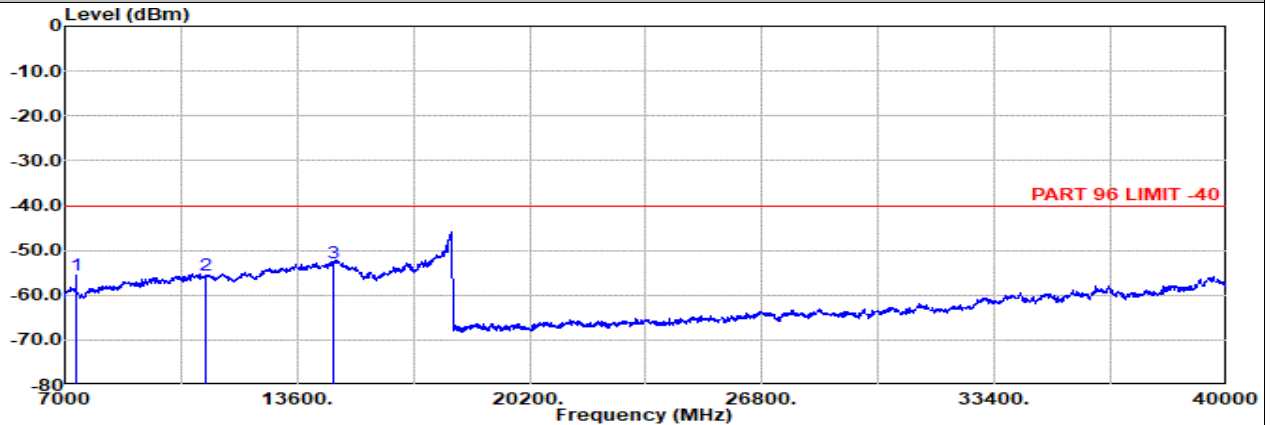


Ant MIMO2

Part 96 NR Mode 58

NR SA n48 40M Ch645332 1RB1 BPSK

H

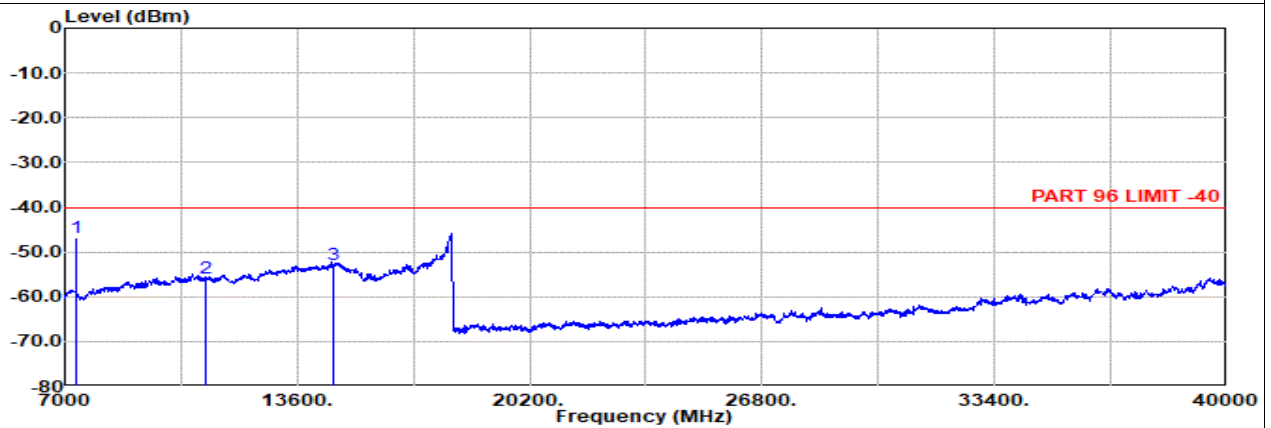


Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Horizontal

: SA n48 40M Ch645332 1RB1 BPSK

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	7324.00	-55.62	RMS	36.76	-52.46	1.07	-95.23	54.24	-40.00	-15.62 Horizontal
2	10986.00	-55.69	RMS	38.73	-49.33	0.66	-95.23	49.48	-40.00	-15.69 Horizontal
3	14649.00	-52.80	RMS	40.50	-46.63	0.65	-95.23	47.91	-40.00	-12.80 Horizontal



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Vertical

: SA n48 40M Ch645332 1RB1 BPSK

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	7324.00	-46.66	RMS	36.76	-52.46	1.07	-95.23	63.20	-40.00	-6.66 Vertical
2	10986.00	-55.82	RMS	38.73	-49.33	0.66	-95.23	49.35	-40.00	-15.82 Vertical
3	14649.00	-52.96	RMS	40.50	-46.63	0.65	-95.23	47.75	-40.00	-12.96 Vertical

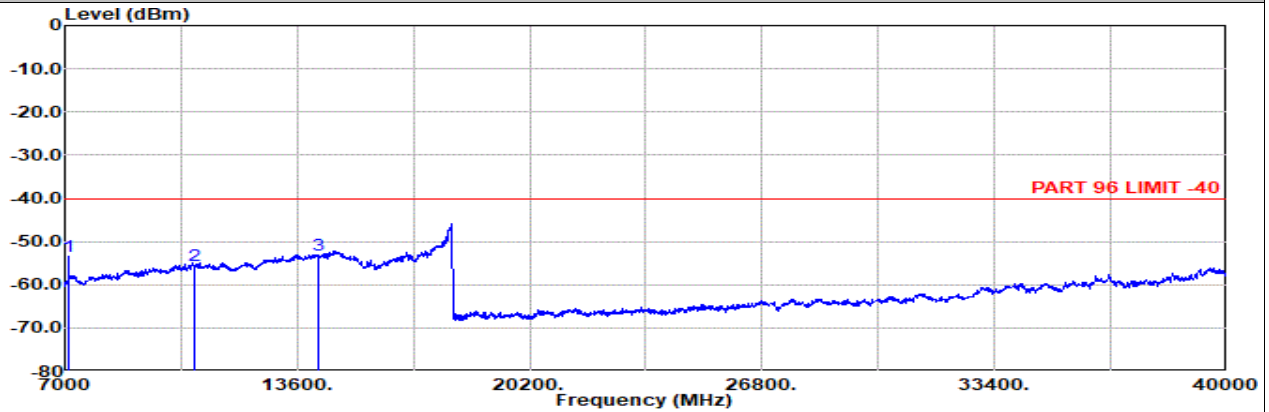


LTE : Ant MIMO2 + 5GNR : Ant Main

Part 96 NR Mode 59

EN-DC B2+n48 20M + 40M Ch18900 1RB0 QPSK + Ch638000 1RB1 BPSK

L



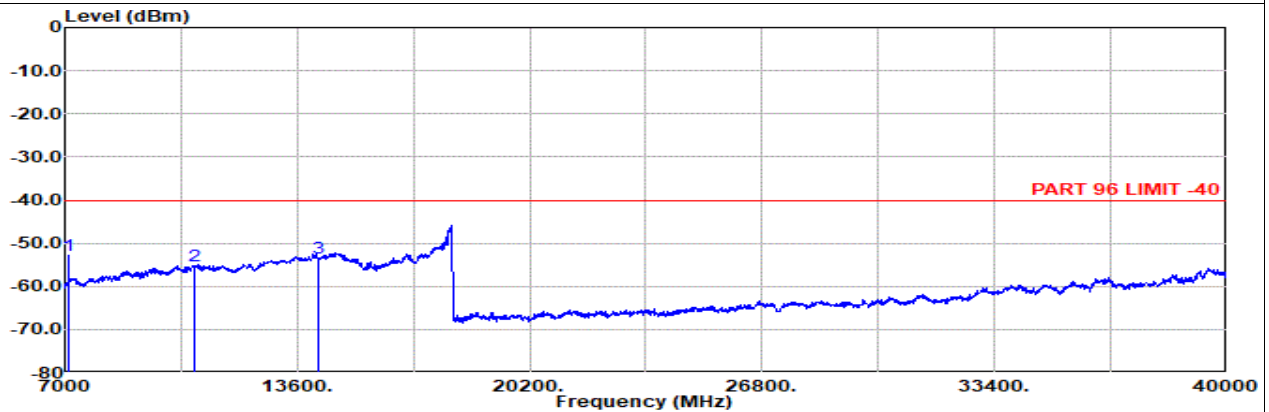
Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Horizontal

: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch638000 1RB1 BPSK

	Freq Level		Detector	Ant Amp\Cb Filter		EIRPCF		Readin Limit		Margin Pol	
	MHz	dBm		Factor	dB	dB	dB	dBuV	dBm	dB	
1	7104.00	-53.52	RMS	36.32	-52.63	1.25	-95.23	56.77	-40.00	-13.52	Horizontal
2	10656.00	-55.50	RMS	39.09	-50.13	0.70	-95.23	50.07	-40.00	-15.50	Horizontal
3	14209.00	-53.23	RMS	40.90	-47.08	0.65	-95.23	47.53	-40.00	-13.23	Horizontal



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Vertical

: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch638000 1RB1 BPSK

	Freq Level		Detector	Ant Amp\Cb Filter		EIRPCF		Readin Limit		Margin Pol	
	MHz	dBm		Factor	dB	dB	dB	dBuV	dBm	dB	
1	7104.00	-52.86	RMS	36.32	-52.63	1.25	-95.23	57.43	-40.00	-12.86	Vertical
2	10656.00	-55.24	RMS	39.09	-50.13	0.70	-95.23	50.33	-40.00	-15.24	Vertical
3	14209.00	-53.46	RMS	40.90	-47.08	0.65	-95.23	47.30	-40.00	-13.46	Vertical

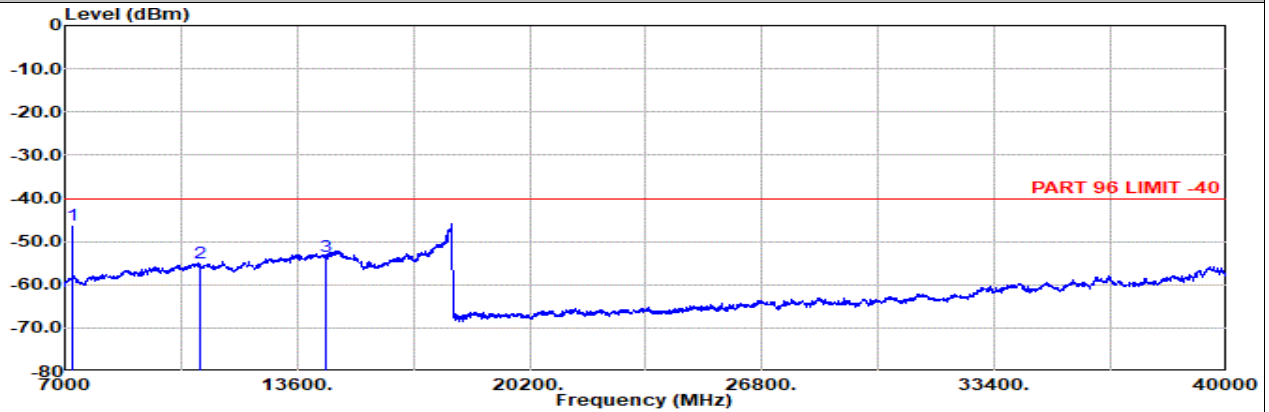


LTE : Ant MIMO2 + 5GNR : Ant Main

Part 96 NR Mode 59

EN-DC B2+n48 20M + 40M Ch18900 1RB0 QPSK + Ch641666 1RB1 BPSK

M



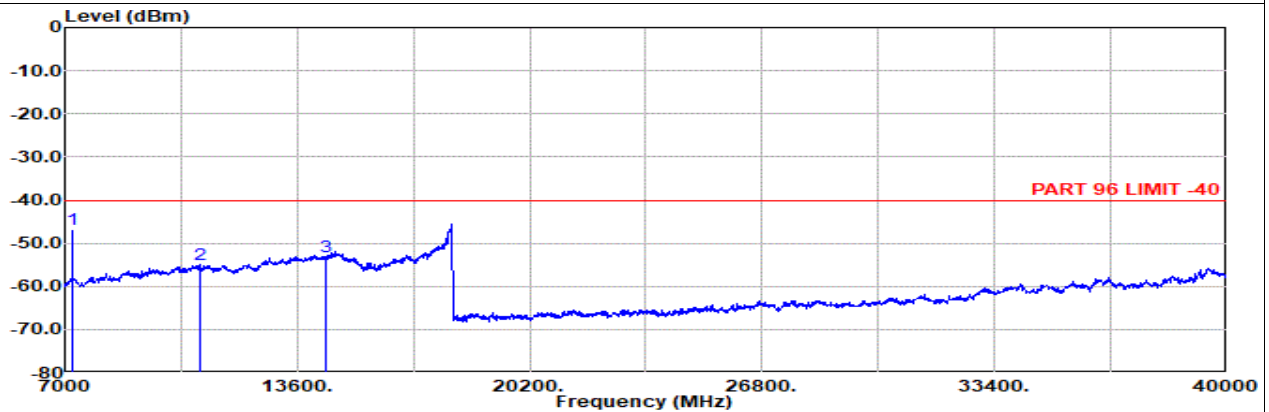
Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Horizontal

: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch641666 1RB1 BPSK

	Freq Level		Detector	Ant Amp\Cb Filter		EIRPCF	Readin Limit		Margin	Pol
	MHz	dBm		Factor	1		g			
1	7214.00	-46.22	RMS	36.86	-52.53	1.15	-95.23	63.53	-40.00	-6.22 Horizontal
2	10821.00	-55.00	RMS	39.02	-49.73	0.68	-95.23	50.26	-40.00	-15.00 Horizontal
3	14429.00	-53.51	RMS	40.54	-46.90	0.65	-95.23	47.43	-40.00	-13.51 Horizontal



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Vertical

: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch641666 1RB1 BPSK

	Freq Level		Detector	Ant Amp\Cb Filter		EIRPCF	Readin Limit		Margin	Pol
	MHz	dBm		Factor	1		g			
1	7214.00	-46.82	RMS	36.86	-52.53	1.15	-95.23	62.93	-40.00	-6.82 Vertical
2	10821.00	-55.07	RMS	39.02	-49.73	0.68	-95.23	50.19	-40.00	-15.07 Vertical
3	14429.00	-53.23	RMS	40.54	-46.90	0.65	-95.23	47.71	-40.00	-13.23 Vertical

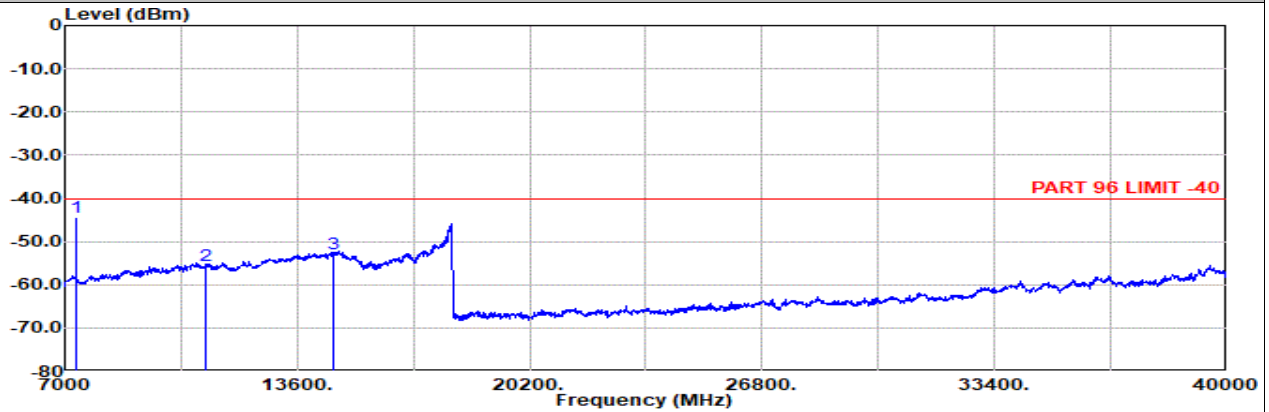


LTE : Ant MIMO2 + 5GNR : Ant Main

Part 96 NR Mode 59

EN-DC B2+n48 20M + 40M Ch18900 1RB0 QPSK + Ch645332 1RB1 BPSK

H



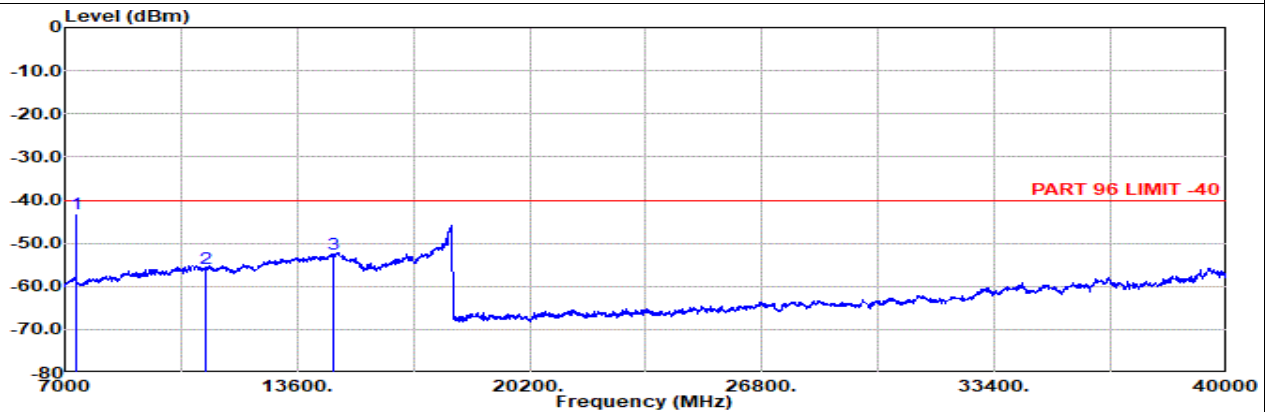
Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Horizontal

: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch645332 1RB1 BPSK

	Freq Level		Detector	Ant Amp\Cb Filter		EIRPCF	Readin Limit		Margin	Pol
	MHz	dBm		Factor	dB		dB	dBm		
1	7324.00	-44.41	RMS	36.76	-52.46	1.07	-95.23	65.45	-40.00	-4.41 Horizontal
2	10986.00	-55.49	RMS	38.73	-49.33	0.66	-95.23	49.68	-40.00	-15.49 Horizontal
3	14649.00	-52.89	RMS	40.50	-46.63	0.65	-95.23	47.82	-40.00	-12.89 Horizontal



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 1m SHF_1224_240624 Vertical

: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch645332 1RB1 BPSK

	Freq Level		Detector	Ant Amp\Cb Filter		EIRPCF	Readin Limit		Margin	Pol
	MHz	dBm		Factor	dB		dB	dBm		
1	7324.00	-43.26	RMS	36.76	-52.46	1.07	-95.23	66.60	-40.00	-3.26 Vertical
2	10986.00	-55.73	RMS	38.73	-49.33	0.66	-95.23	49.44	-40.00	-15.73 Vertical
3	14649.00	-52.59	RMS	40.50	-46.63	0.65	-95.23	48.12	-40.00	-12.59 Vertical

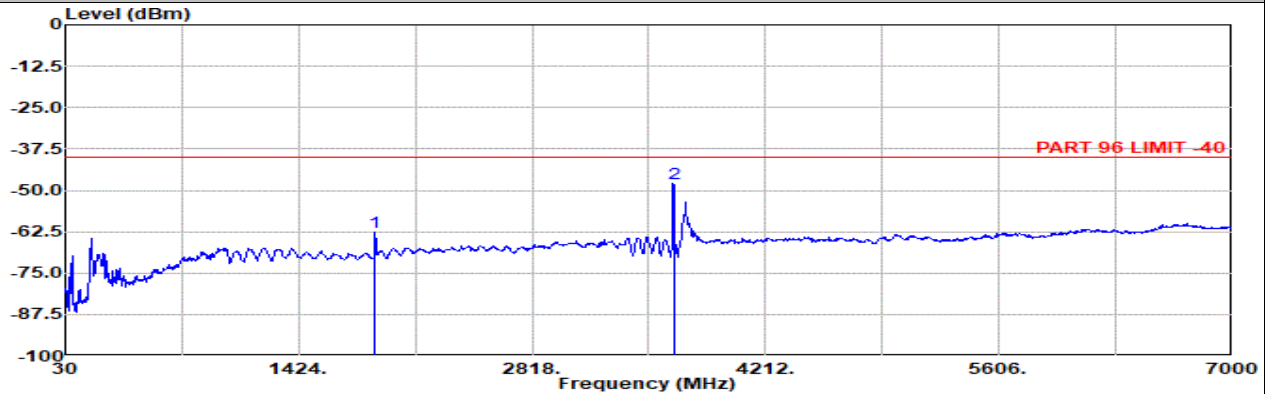


LTE : Ant MIMO2 + 5GNR : Ant Main

Part 96 NR Mode 59

EN-DC B2+n48 20M + 40M Ch18900 1RB0 QPSK + Ch645332 1RB1 BPSK

H



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 3m CBL6111D _47020 & 06_241005 Horizontal

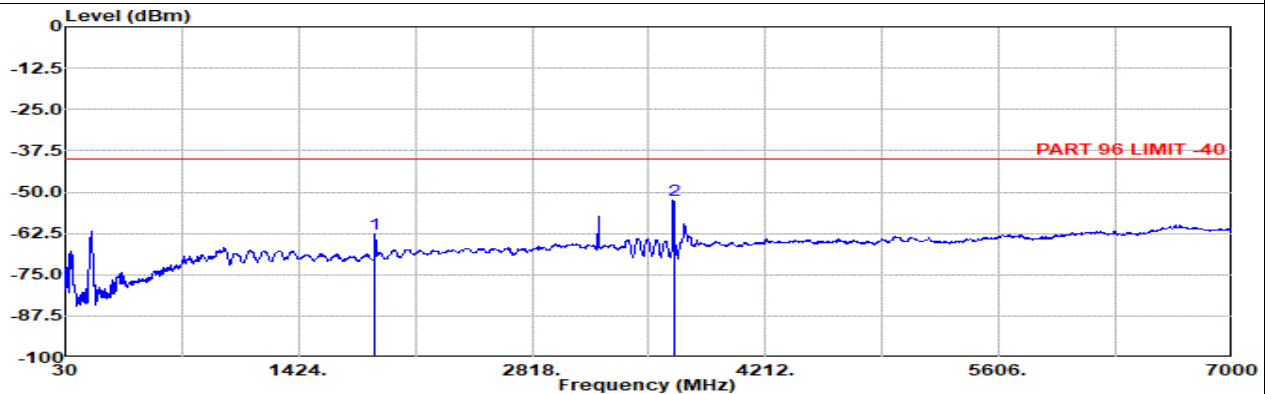
: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch645332 1RB1 BPSK

: #1 is fundamental signal which can be ignored.

: #2 is fundamental signal which can be ignored.

	Freq MHz	Level dBm	Detector	Ant Amp\Cb		Filter 1	EIRPCF	Readin Limit		Margin	Pol
				Factor	dB/m	dB	dB	dBuV	dBm		
1	1882.00	-62.66	RMS	25.42	-61.29	0.21	-95.23	68.23	-40.00	-22.66	Horizontal
2	3664.00	-47.85	RMS	29.60	-57.39	0.59	-95.23	74.58	-40.00	-7.85	Horizontal



Site : 03CH16-HY

Condition: PART 96 LIMIT -40 3m CBL6111D _47020 & 06_241005 Vertical

: LTE Band 2 20M Ch18900 1RB0 QPSK

: SA n48 40M Ch645332 1RB1 BPSK

: #1 is fundamental signal which can be ignored.

: #2 is fundamental signal which can be ignored.

	Freq MHz	Level dBm	Detector	Ant Amp\Cb		Filter 1	EIRPCF	Readin Limit		Margin	Pol
				Factor	dB/m	dB	dB	dBuV	dBm		
1	1882.00	-62.52	RMS	25.42	-61.29	0.21	-95.23	68.37	-40.00	-22.52	Vertical
2	3664.00	-52.55	RMS	29.60	-57.39	0.59	-95.23	69.88	-40.00	-12.55	Vertical

Remark: #1 and #2 are fundamental signals which can be ignored.