TEST REPORT

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Test Report Number: SKT-RFC-160004
Date of issue: March 31, 2016

Applicant:	**G.I.T Co., Ltd.** GIT BLDG., 38-5 Garakbon-Dong, Songpa-Gu, Seoul, 138-801 Korea
Manufacturer:	**G.I.T Co., Ltd.** GIT BLDG., 38-5 Garakbon-Dong, Songpa-Gu, Seoul, 138-801 Korea
Product:	Scan Tool
Model:	**Auto Link**
FCC ID:	TMGG1QDDMM003
File number:	SKTEU16-0144
EUT received:	February 11, 2016

Applied standards:	ANSI C63.10-2009 and ANSI C63.4-2009 558074 D01 DTS Meas Guidance v03r04
Rule parts:	FCC Part 15 Subpart C - Intentional radiators
Equipment Class:	**DTS - Part 15 Digital Transmission System**

Remarks to the standards:	None

The above equipment has been tested by SK Tech Co., Ltd., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product or system, which was tested.

HWS

Wonsik Ham **/ Testing Engineer**

Jongsoo Yoon **/ Technical Manager**

Revision History of Report

Rev.	Revisions	Effect page	Reviewed by	Date
-	Initial issue	All	Jongsoo Yoon	March 31, 2016

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1 Summary of test results

Requirement	CFR 47 Section	Result
Antenna Requirement	15.203, 15.247(b)(4)	Meets the requirements
6dB Bandwidth	15.247(a)(2)	Meets the requirements
Maximum Peak Output Power	15.247(b)(3), (4)	Meets the requirements
Spurious Emission, Band Edge, and Restricted bands	15.247(d), 15.205(a), 15.209(a)	Meets the requirements
Peak Power Spectral Density	15.247(e)	Meets the requirements

** The product is powered from a DC 12 V lead-acid battery in a vehicle.

2 Description of equipment under test (EUT)

Product:	Scan Tool
Model:	**Auto Link**
Serial number:	None (prototype)

Model differences:

Model name	Difference	Tested (checked)
Auto Link	Fully tested model that was provided by the applicant	☒

Technical data:

Power source	DC 7 V to 18 V (12 V lead-acid battery installed in vehicles)
Local Oscillator or X-Tal	32.768 kHz, 8 MHz, 16 MHz
Transmit Frequency	2402 MHz ~ 2480 MHz (40 channels, Bluetooth LE only)
Antenna Type	Integral chip antenna(gain: 1.99 dBi)
Type of Modulation	GFSK
RF Output power	-1.47 dBm PEAK(measured)

I/O port	Type	Q'ty	Remark
OBD-II	OBD-II	1	

Equipment Modifications

none

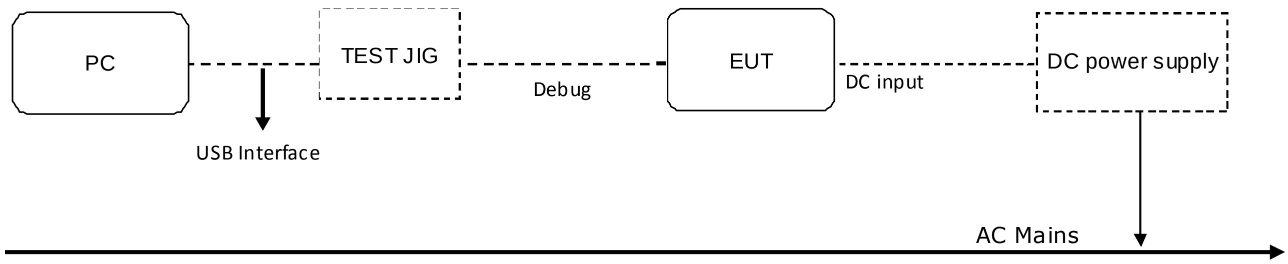
Submitted Documents

Block diagram
Schematic diagram
Parts List
User manual

3 Test and measurement conditions

3.1. Test configuration (arrangement of EUT)

The measurements were taken in continuous transmitting mode using the test mode. For controlling the EUT, the test software (ConnectionManager) and the cable assembly were provided by the applicant.



3.2. Description of support units (accessory equipment)

The following support units or accessories were used to form a representative test configuration during the tests.

#	Equipment	Manufacturer	Model No.	Serial No.
1	PC	DELL INC.	7XH86BX	17261795085
2	TEST JIG	-	-	-
3	DC power supply	HP	6633A	2838A0100

Note: *For radiated spurious emission measurements, the measurements were performed without PC after setting the radio module to TEST MODE.*

3.3. Interconnection and I/O cables

The following support units or accessories were used to form a representative test configuration during the tests.

#	Start		End		Cable	
	Name	I/O port	Name	I/O port	length (m)	shielded (Y/N)
1	EUT	Debug	TEST JIG	Debug	0.1	N
2	EUT	DC Input	DC power supply	DC Output	2.5	N
3	TEST JIG	RS-232	PC	USB	2.0	N

Note: *1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*

3.4. Measurement Uncertainty (*U*)

Measurement Item	Combined Standard Uncertainty *Uc*	Expanded Uncertainty $U = k \times Uc$ (k = 2)
Conducted RF power	±1.49 dB	±2.98 dB
Radiated disturbance	±2.30 dB	±4.60 dB
Conducted disturbance	±1.96 dB	±3.92 dB

3.5. Test date

Date Tested	March 1, 2016 – March 8, 2016

4 Facilities and accreditations

4.1. Facilities

All of the measurements described in this report were performed at SK Tech Co., Ltd

Site I: 820-2, Wolmoon-ri, Wabu-up, Namyangju-si, Kyunggi-do, Korea

Site II: 688-8, Wolmoon-ri, Wabu-up, Namyangju-si, Kyunggi-do, Korea

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-4. The sites comply with the Normalized Site Attenuation requirements given in ANSI C63.4, and site VSWR requirements specified in CISPR 16-1-4. The measuring apparatus and ancillary equipment conform to CISPR 16-1 series.

4.2. Accreditations

The laboratory has been also notified to FCC by RRA as a Conformity Assessment Body, and designated to perform compliance testing on equipment subject to Declaration of Conformity (DOC) and Certification under Parts 15 and 18 of the FCC Rules.

Designation No.	KR0007

4.3. List of test and measurement instruments

No	Description	Manufacturer	Model	Serial No.	Cal. due	Use
1	Spectrum Analyzer	Agilent	E4405B	US40520856	2017.03.07	
2	Spectrum Analyzer	Agilent	E4440A	MY46186322	2017.03.08	☒
3	EMC Spectrum Analyzer	Agilent	E7405A	US40240203	2016.07.08	
4	EMI Test Receiver	Rohde&Schwarz	ESIB40	100277	2017.03.08	☒
5	EMI Test Receiver	PMM9010F	Narda	020WW40105	2016.07.09	
6	Artificial Mains Network	Rohde&Schwarz	ESH2-Z5	834549/011	2016.07.09	
7	Pre-amplifier	HP	8447D	2944A07994	2016.07.10	☒
8	Pre-amplifier	MITEQ	AFS44	1116321	2016.07.09	☒
9	Pre-amplifier	TSJ	MLA-100M18-B02-38	1359546	2017.03.07	☒
10	Power Meter	Agilent	E4417A	MY45100426	2016.07.10	
11	Power Meter	Agilent	E4418B	US39402176	2016.07.10	
12	Power Sensor	Agilent	E9327A	MY44420696	2016.07.10	
13	Power Sensor	Agilent	8485A	3318A13916	2016.07.10	
14	Attenuator (10dB)	HP	8491B	38067	2016.07.09	☒
15	High Pass Filter	Wainwright	WHKX3.0/18G	8	2016.07.08	☒
16	VHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	VHAP	1014 / 1015	2017.10.21	
17	UHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	UHAP	989 / 990	2017.10.21	
18	Loop Antenna	Schwarzbeck	HFH2-Z2	863048/019	2017.11.25	☒
19	Bilog Broadband Antenna	Sunol Sciences	JB1	A060910	2017.11.19	☒
20	Horn Antenna	AH Systems	SAS-200/571	304	N/A	
21	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-816	2017.05.15	☒
22	Horn Antenna	ETS-LINDGREN	3115	00056768	2017.08.28	
23	Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170318	2016.09.06	☒
24	Vector Signal Generator	Agilent	E4438C	MY42080359	2016.07.09	
25	PSG analog signal generator	Agilent	E8257D-520	MY45141255	2016.07.09	
26	DC Power Supply	HP	6633A	2838A0100	2016.09.24	☒
27	DC Power Supply	HP	6268B	2542A-07856	2016.07.08	
28	Hygro/Thermo Graph	Testo	608-H1	-	2016.07.11	☒
29	Temperature/Humidity Chamber	All Three	ATM-50M	20030425	2017.03.08	

5 Test and measurements

5.1. Antenna requirement

5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.2 Result: PASS

The transmitter has the integral PCB antenna. The directional gain of the antenna is less than 1.99 dBi.

5.2. 6 dB bandwidth

5.2.1 Regulation

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

5.2.2 Test Procedure

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

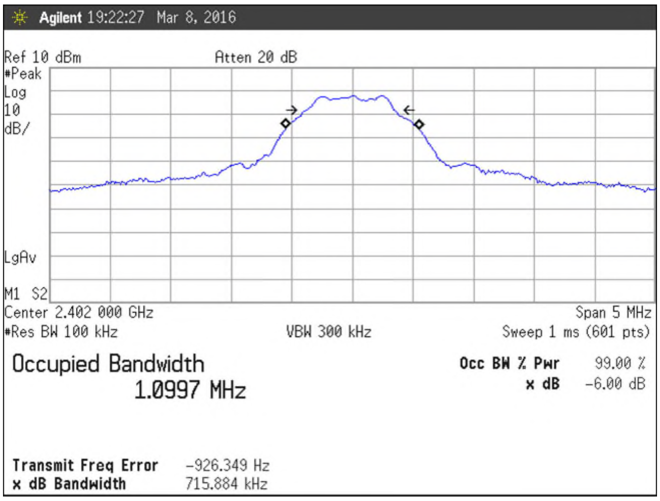
5.2.3 Test Results: PASS

Table 1: Measured value of the 6 dB Bandwidth

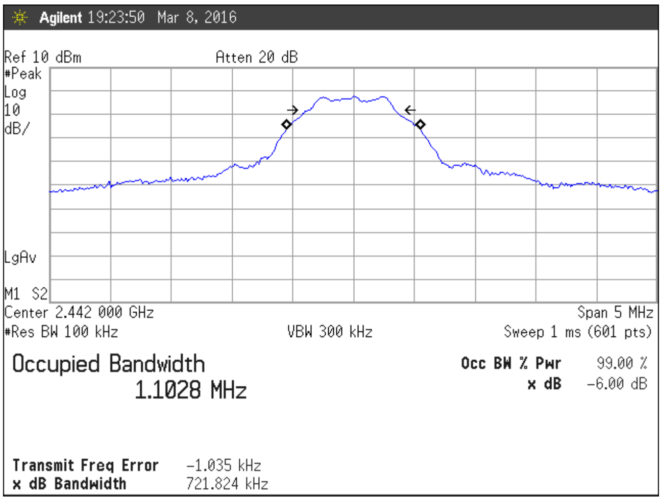
Modulation	Operating frequency	Occupied Bandwidth (99%)	6dB Bandwidth	Limit
GFSK	2402 MHz	1.100 MHz	0.716 MHz	≥ 500 kHz
	2442 MHz	1.103 MHz	0.722 MHz	≥ 500 kHz
	2480 MHz	1.101 MHz	0.728 MHz	≥ 500 kHz

Figure 1. Plot of the 6dB Bandwidth & Occupied Bandwidth (99%)

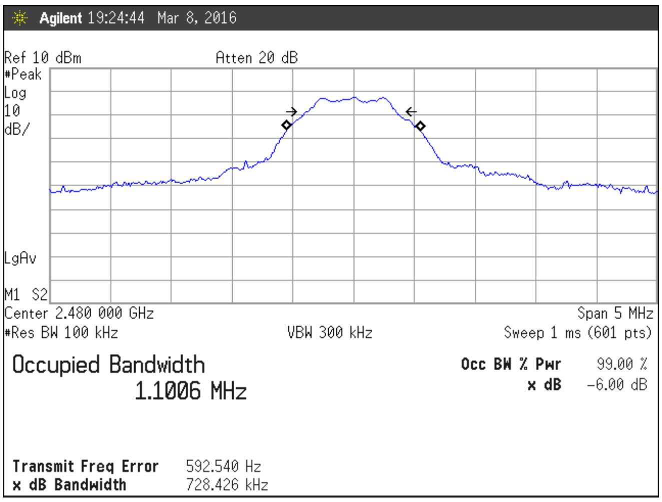
Lowest Channel (2402 MHz)



Middle Channel (2442 MHz)



Highest Channel (2480 MHz)



5.3. Maximum peak output power

5.3.1 Regulation

According to §15.247(b)(3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3.2 Test Procedure

1. Set the RBW ≥ DTS bandwidth.
2. Set the VBW ≥ 3 x RBW
3. Set the span ≥ 3 x RBW.
4. Sweep time = auto couple.
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use peak marker function to determine the peak amplitude level.

5.3.3 Test Results: PASS

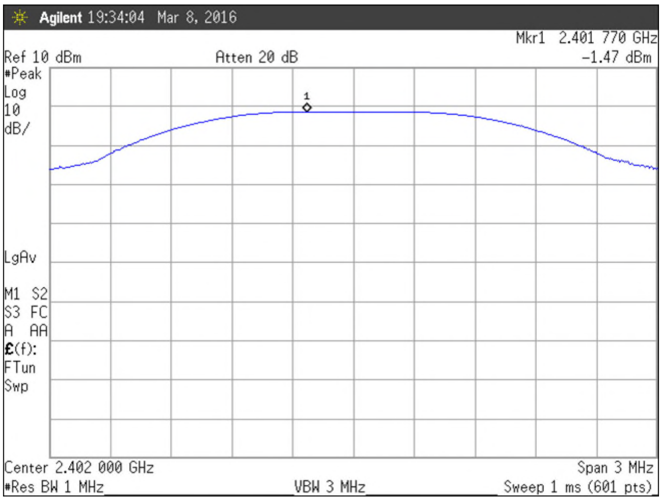
Table 2: Measured values of the Maximum Peak Conducted Output Power

Modulation	Operating Frequency	Peak Power		Average Power [dBm] (NOTE)	Limit
		[dBm]	W		
GFSK	2402 MHz	-1.47	0.000 713	-4.69	1 W
	2442 MHz	-1.84	0.000 655	-5.06	1 W
	2480 MHz	-1.88	0.000 649	-5.13	1 W

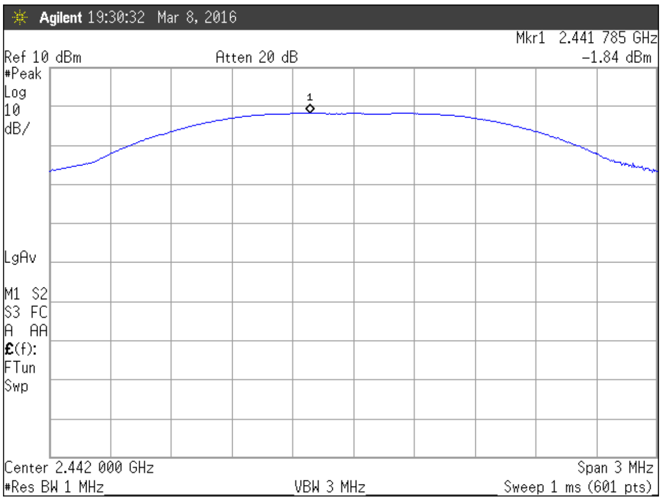
NOTE The Average power were measured using AVGSA- 1 method as the reference only.

Figure 2. Plot of the Maximum Peak Conducted Output Power

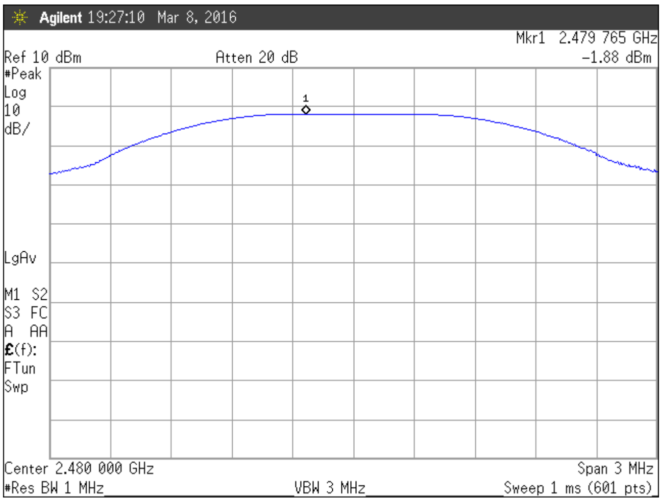
Lowest Channel (2402 MHz)



Middle Channel (2442 MHz)



Highest Channel (2480 MHz)



5.4. Spurious emissions, Band edge, and Restricted bands

5.4.1 Regulation

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

According to §15.209(a), the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength limit (μV/m)	Field strength limit (dBμV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	48.5 - 13.8	300
0.490 - 1.705	24000/F (kHz)	33.6 - 23.0	30
1.705 - 30.0	30	29.5	30
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

** The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector. For the frequency bands 9 - 90 kHz, 110 - 490 kHz and above 1000 MHz, the radiated emission limits are based on measurements employing an average detector.

5.4.2 Test Procedure

<u>1) Band-edge measurements for RF conducted emissions</u>

1. Set the spectrum analyzer as follows:

   Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation

   RBW ≥ 1 % of spectrum analyzer display span

   VBW ≥ RBW

   Sweep = auto

   Detector function = peak

   Trace = max hold

2. Allow the trace to stabilize. Set the marker on the emission at the band-edge, or on the highest modulation product outside of the band, if this level is greater than that at the band-edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.

3. Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

2) Spurious RF Conducted Emissions:

1. Set the spectrum analyzer as follows:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz
   VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold
2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.

3) Spurious Radiated Emissions:

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters or 1 meter if applicable.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated (0º to 360º).
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, from 30 to 1000 MHz using the Bilog broadband antenna, and from 1 GHz to tenth harmonic of the highest fundamental frequency using the horn antenna.
4. To increase the overall measurement sensitivity, the closer test distances and/or narrower bandwidths may be used. If the closer measurement distance (1 meter) were used, the 0.2-meter height styrofoam was additionally placed on top of the 0.8-meter height table taking into account of the beamwidth of the measuring antenna versus size of the EUT.
5. To obtain the final measurement data, each frequency found during preliminary measurements was re-examined and investigated. The test receiver was set up to average, peak, and quasi-peak detector function with specified bandwidth. It was attempted to maximize the emission, by varying the configuration of the EUT and the cables routing.
6. The EUT is situated in three orthogonal planes (if appropriate)
7. If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative "marker-delta" method may be employed.

4) Marker-Delta Method at the edge of the authorized band of operation:

1. Perform an in-band field strength measurement of the fundamental emission using the RBW and detector function specified in 6.3 and 6.4, 6.5, or 6.6, as applicable, and the appropriate regulatory requirements for the frequency being measured.43
2. Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to approximately 1 % to 5 % of the total span, unless otherwise specified, with a video bandwidth equal to or greater than the RBW.
   Record the peak levels of the fundamental emission and the relevant band-edge emission (i.e., run several sweeps in peak hold mode). Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not an absolute field strength measurement; it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.
3. Subtract the delta measured in b) from the field strengths measured in a). The resultant field strengths (CISPR QP, average, or peak, as appropriate) are then used to determine band-edge compliance of the restricted bands, described in 5.9.
4. The above "delta" measurement technique may be used for measuring emissions that are up to two "standard" bandwidths away from the band edge, where a "standard" bandwidth is the bandwidth specified by 4.2.3.2 for the frequency being measured. For example, band-edge measurements in the restricted band that begins at 2483.5 MHz require a measurement bandwidth of at least 1 MHz.
   Therefore the "delta" technique for measuring emissions up to 2 MHz removed from the band edge may be used. Radiated emissions that are removed by more than two "standard" bandwidths shall be measured in the conventional manner.

5.4.3 Test Results: PASS

Band-edge compliance of RF conducted/radiated emissions was shown in the Figure 3 and 4.
Spurious RF conducted emissions were shown in the Figure 5.

NOTE : for conducted measurement, we took the insertion loss of the cable loss into consideration within the measuring instrument. And for radiated measurement, the results were calibrated to the field strength within the measuring instrument; Table 3 contains the correction factors at the operating frequencies such as antenna factor, cable loss, etc.

Table 3: Measured values of the Field strength of spurious emission (Radiated)

Average/Peak/Quasi-peak data, radiated emissions (below 30 MHz)

Frequency [MHz]	RBW [kHz]	Reading [dB(μV/m)]	AF [dB]	Cable Loss [dB]	Actual [dB(μV/m)]	Limit (at 3m) [dB(μV/m)]	Margin [dB]	
		No Radiated Spurious Emissions Found						

Quasi-peak data, radiated emissions (30 MHz to 1000 MHz)

Frequency (MHz)	Pol. (V/H)	Height (m)	Reading (dBμV)	AMP (dB)	AF (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
164.24	H	1.49	34.6	28.1	12.0	1.9	20.4	43.5	23.1
164.24	V	2.26	27.7	28.1	12.0	1.9	13.5	43.5	30.0
214.63	H	1.25	36.3	27.8	12.4	2.2	23.1	43.5	20.4
214.63	V	1.00	34.0	27.8	12.4	2.2	20.8	43.5	22.7
232.77	H	1.44	36.8	27.7	12.3	2.3	23.7	46.0	22.3
232.77	V	1.62	26.3	27.7	12.3	2.3	13.2	46.0	32.8

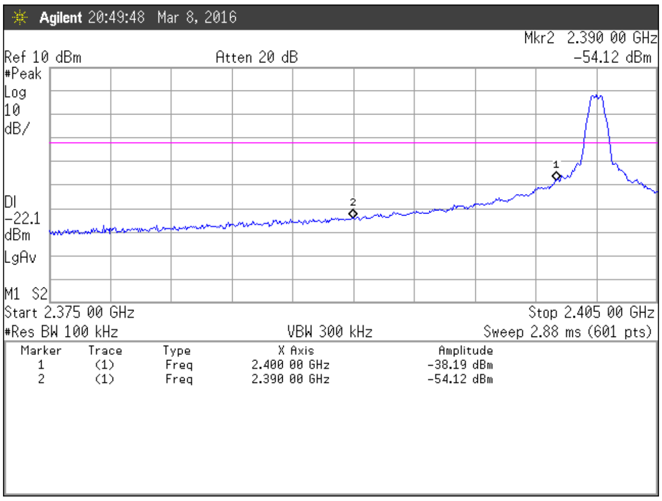
Note: *1) V/H: Vertical / Horizontal polarization*
2) AMP, AF and CL: pre-amplifier gain, antenna factor and cable loss including an attenuator/filter if used
3) Actual = Reading -AMP + AF + CL
4) Margin = Limit - Actual

Peak and average data, radiated emissions (above 1000 MHz)													
Freq. (MHz)	Pol. (V/H)	Height (m)	Reading (dBμV)		AMP (dB)	AF (dB/m)	CL (dB)	Actual (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
			PK	AV				PK	AV	PK	AV	PK	AV
2386.0	H	1.00	56.7	34.5	39.2	27.2	7.5	52.2	30.0	74.0	54.0	21.8	24.0
2390.0	H	1.00	59.4	29.5	39.2	27.2	7.5	54.9	25.0	74.0	54.0	19.1	29.0
2390.0	V	2.23	49.2	28.2	39.2	27.2	7.5	44.7	23.7	74.0	54.0	29.3	30.3
2483.6	H	1.00	69.2	37.3	39.2	27.2	7.5	64.7	32.8	74.0	54.0	9.3	21.2
2483.6	V	1.22	60.2	30.3	39.2	27.2	7.5	55.7	25.8	74.0	54.0	18.3	28.2
4803.9	H	1.00	43.2	31.8	38.9	31.3	12.6	48.2	36.8	74.0	54.0	25.8	17.2
4804.0	V	1.00	39.7	27.7	38.9	31.3	12.6	44.7	32.7	74.0	54.0	29.3	21.3
4883.9	H	1.00	43.2	31.8	38.9	31.4	12.9	48.6	37.2	74.0	54.0	25.4	16.8
4883.9	V	1.00	40.8	29.0	38.9	31.4	12.9	46.2	34.4	74.0	54.0	27.8	19.6
4959.8	H	1.00	43.1	32.4	38.9	31.6	13.1	48.9	38.2	74.0	54.0	25.1	15.8
4959.8	V	1.00	40.6	28.5	38.9	31.6	13.1	46.4	34.3	74.0	54.0	27.6	19.7

Note: *1) V/H: Vertical / Horizontal polarization*
2) PK/AV: Peak / Average values
2) AMP, AF and CL: pre-amplifier gain, antenna factor and cable loss including an attenuator/filter if used
4) Actual = Reading -AMP + AF + CL
5) Margin = Limit - Actual

Figure 3. Plot of the Band Edge (Conducted)

Lowest Channel (2402 MHz)



Highest Channel (2480 MHz)

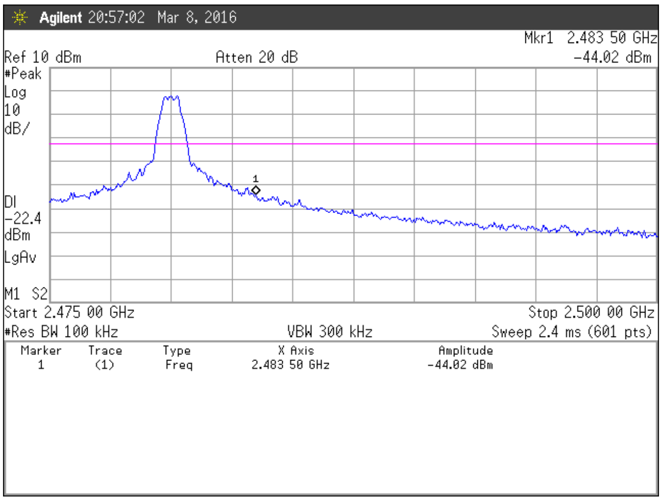
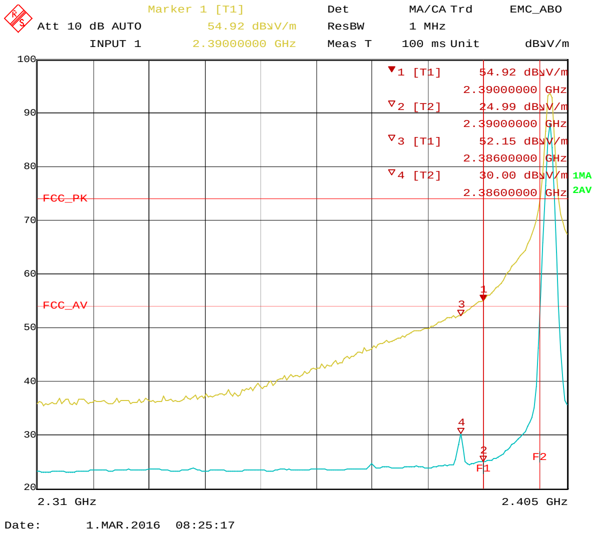
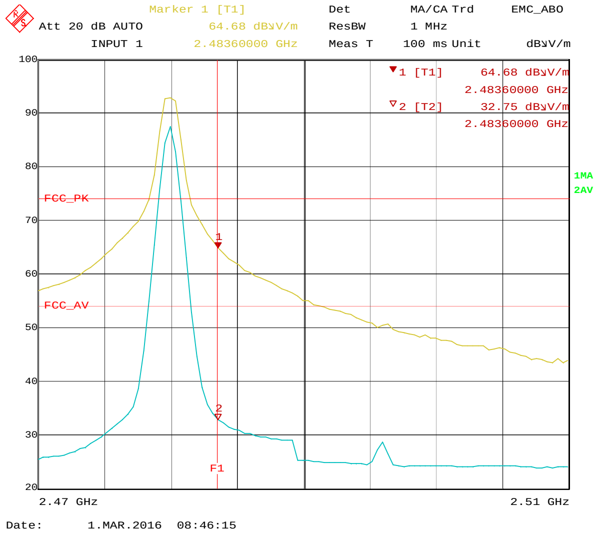


Figure 4. Plot of the Band Edge (Radiated)

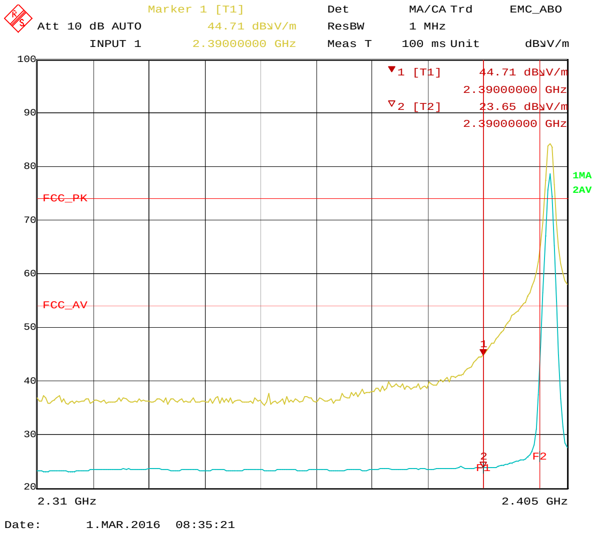
Lowest Channel (2402 MHz)
Horizontal



Highest Channel (2480 MHz)
Horizontal



Lowest Channel (2402 MHz)
Vertical



Highest Channel (2480 MHz)
Vertical

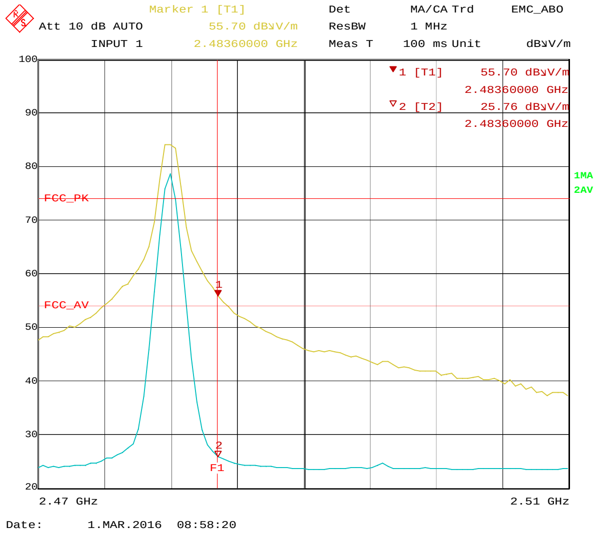
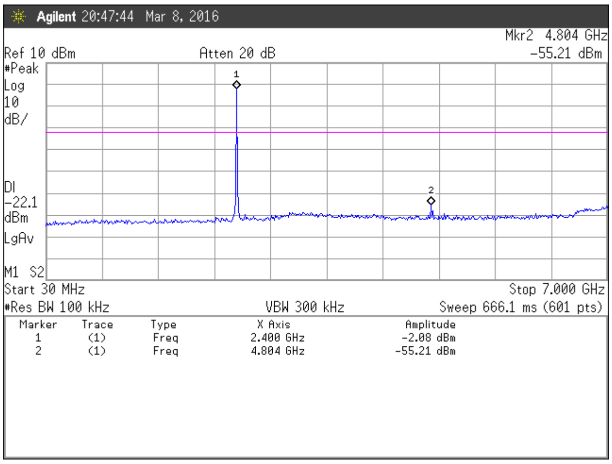
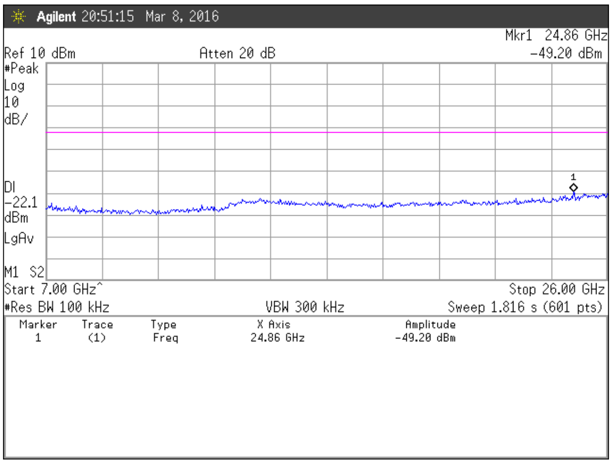


Figure 5. Spurious RF conducted emissions

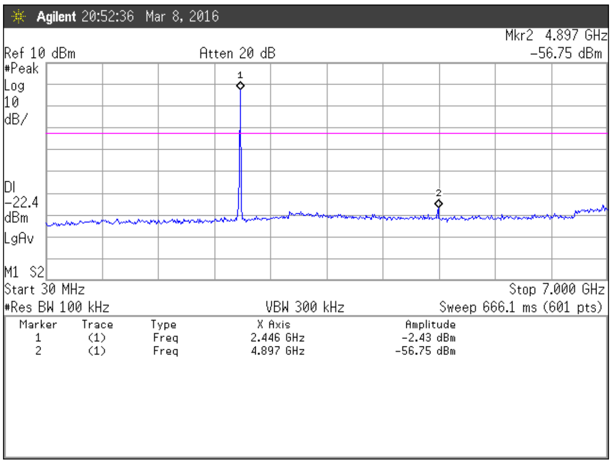
Lowest Channel (2402 MHz): 30 MHz ~ 7 GHz



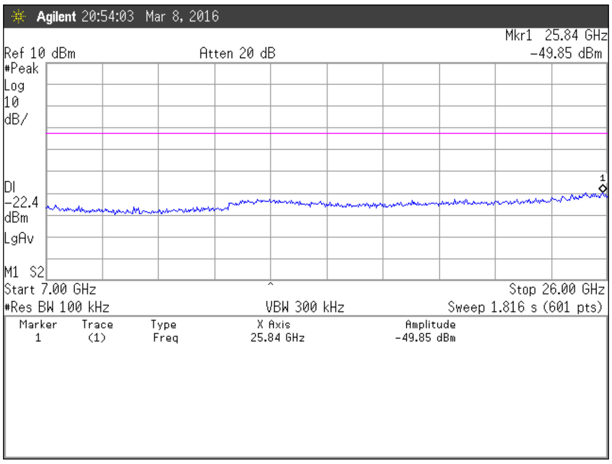
Lowest Channel (2402 MHz): 7 GHz ~ 25 GHz



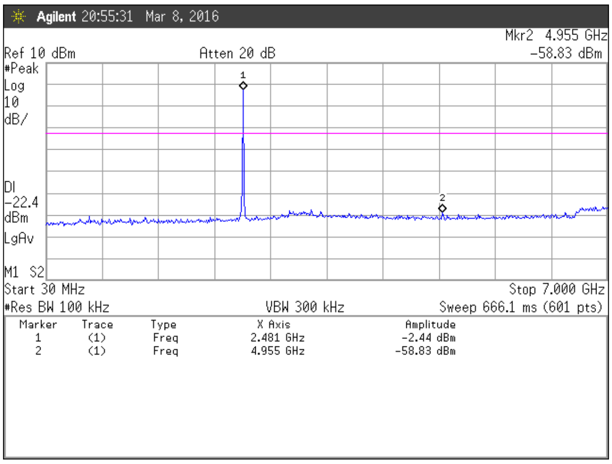
Middle Channel (2442 MHz): 30 MHz ~ 7 GHz



Middle Channel (2442 MHz): 7 GHz ~ 25 GHz



Highest Channel (2480 MHz): 30 MHz ~ 7 GHz



Highest Channel (2480 MHz): 7 GHz ~ 25 GHz

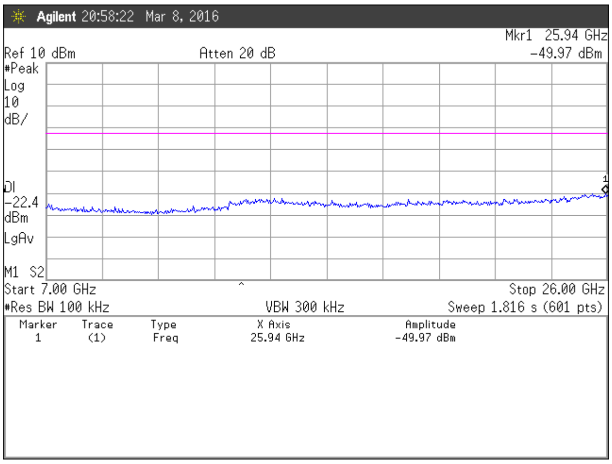
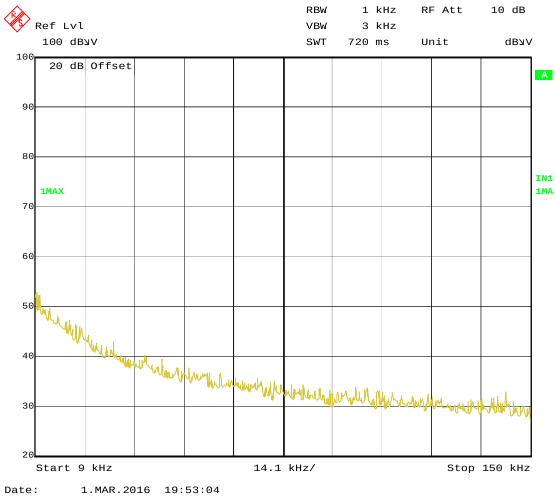
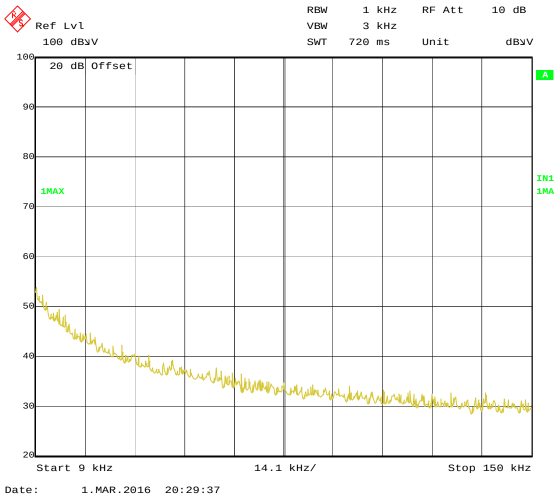


Figure 6. Emission plot for the preliminary radiated measurements

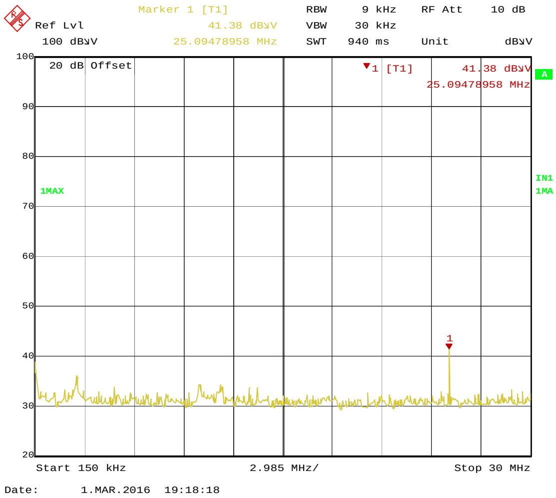
Operating at 2402 MHz: 9 kHz ~ 150 kHz (@ 3-m distance)



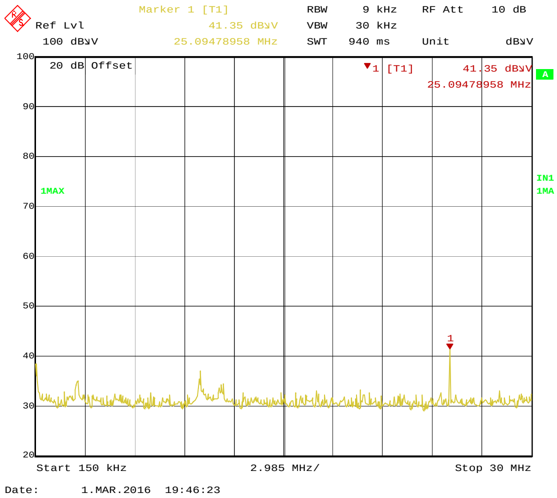
Operating at 2480 MHz: 9 kHz ~ 150 kHz (@ 3-m distance)



Operating at 2402 MHz: 150 kHz ~ 30 MHz (@ 3-m distance)

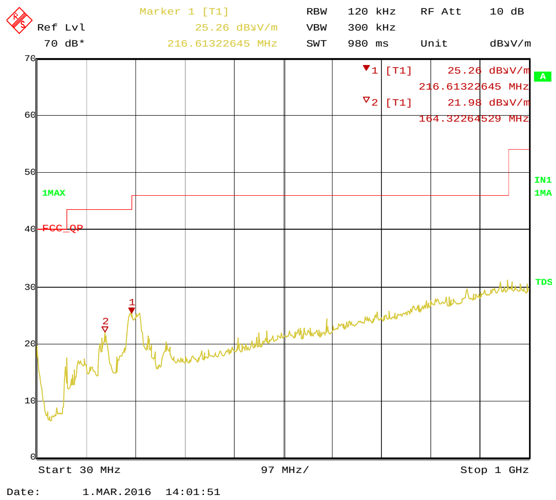


Operating at 2480 MHz: 150 kHz ~ 30 MHz (@ 3-m distance)

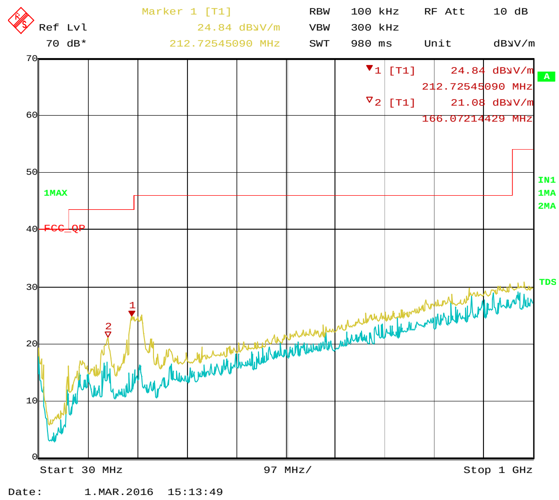


Emission plot for the preliminary radiated measurements *(continued)*

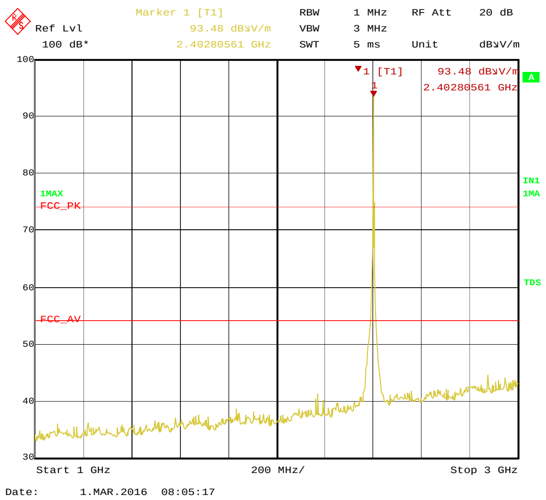
Operating at 2402 MHz: 30 MHz ~ 1 GHz (@ 3-m distance)



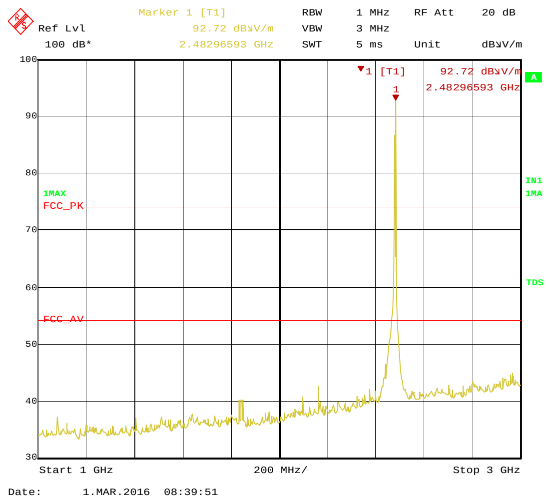
Operating at 2480 MHz: 30 MHz ~ 1 GHz (@ 3-m distance)



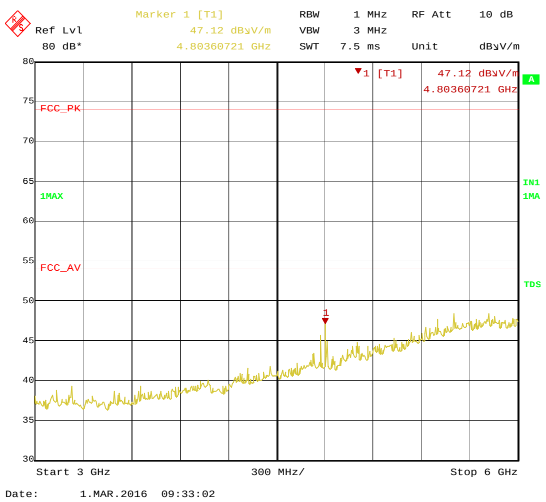
Operating at 2402 MHz: 1 GHz ~ 3 GHz (@ 3-m distance)



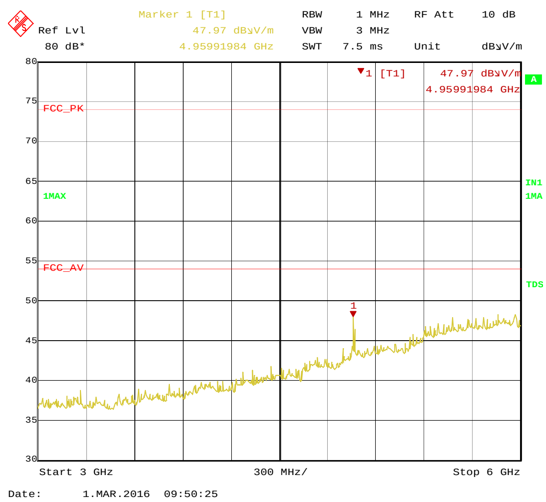
Operating at 2480 MHz: 1 GHz ~ 3 GHz (@ 3-m distance)



Operating at 2402 MHz: 3 GHz ~ 6 GHz (@ 3-m distance)

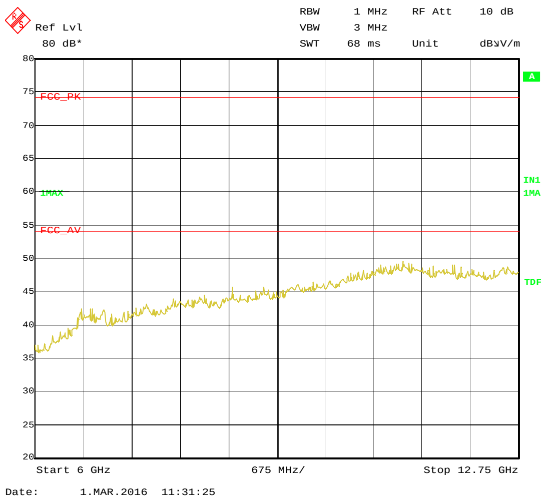


Operating at 2480 MHz: 3 GHz ~ 6 GHz (@ 3-m distance)

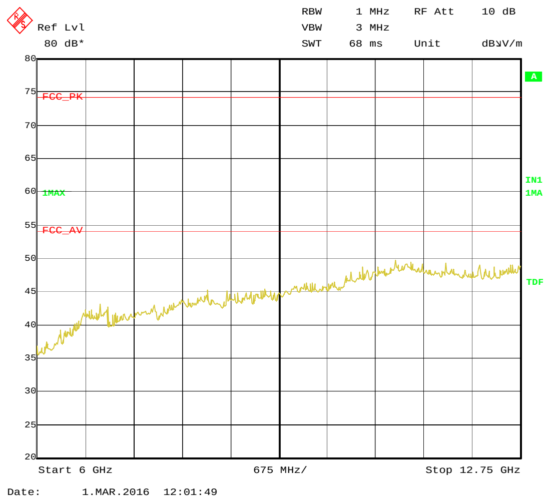


Emission plot for the preliminary radiated measurements *(continued)*

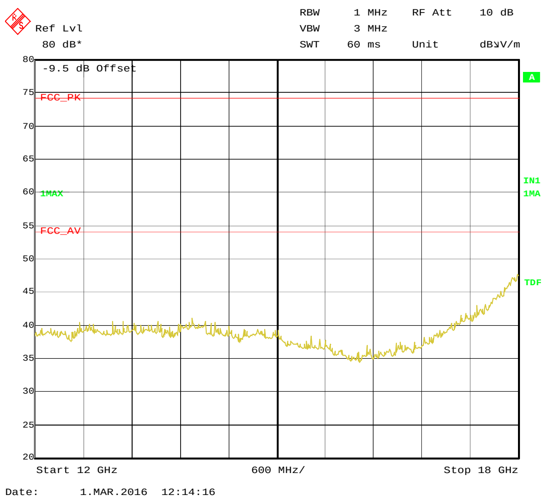
Operating at 2402 MHz: 6 GHz ~ 12 GHz (@ 3-m distance)



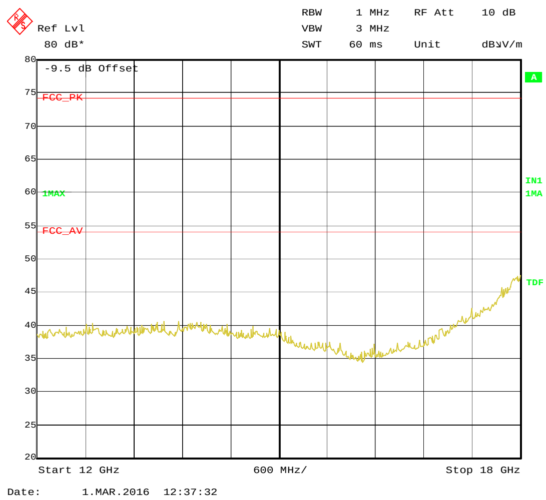
Operating at 2480 MHz: 6 GHz ~ 12 GHz (@ 3-m distance)



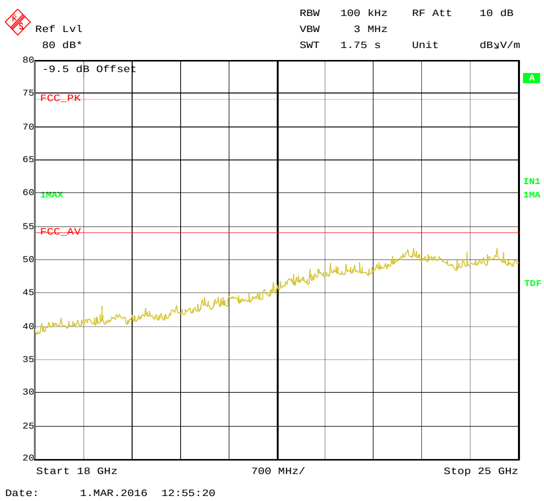
Operating at 2402 MHz: 12 GHz ~ 18 GHz (@ 1-m distance)



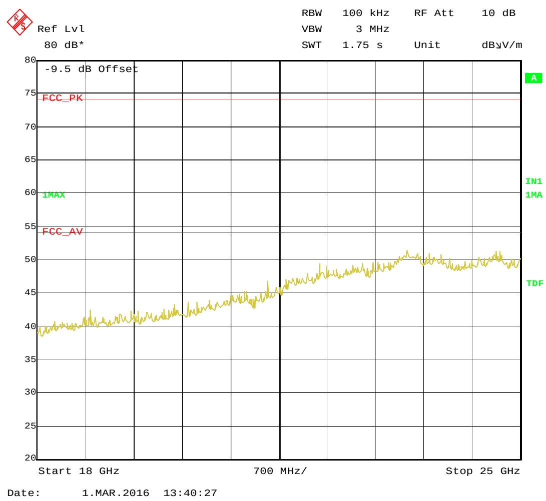
Operating at 2480 MHz: 12 GHz ~ 18 GHz (@ 1-m distance)



Operating at 2402 MHz: 18 GHz ~ 25 GHz (@ 1-m distance)



Operating at 2480 MHz: 18 GHz ~ 25 GHz (@ 1-m distance)



5.5. Peak power spectral density

5.5.1 Regulation

According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

5.5.2 Test Procedure(peak PSD)

Set the spectrum analyzer as follows:

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.5.3 Test Results: PASS

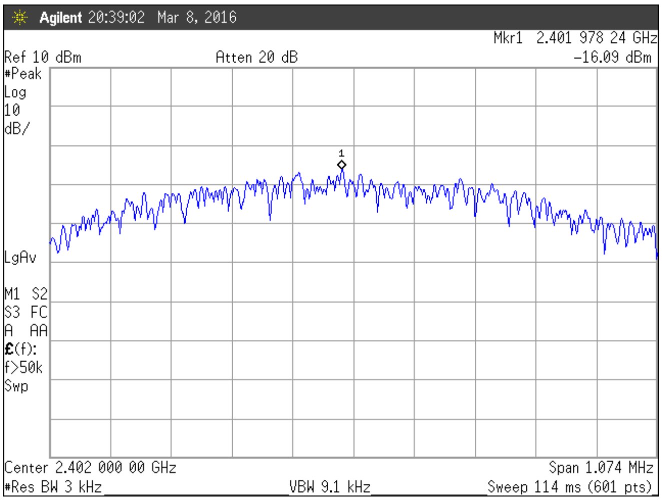
Table 4: Measured values of the Peak Power Spectral Density

Modulation	Operating frequency	PSD/3 kHz (dBm)	Limit (dBm)
GFSK	2402 MHz	-16.09	8
	2442 MHz	-16.49	8
	2480 MHz	-16.61	8

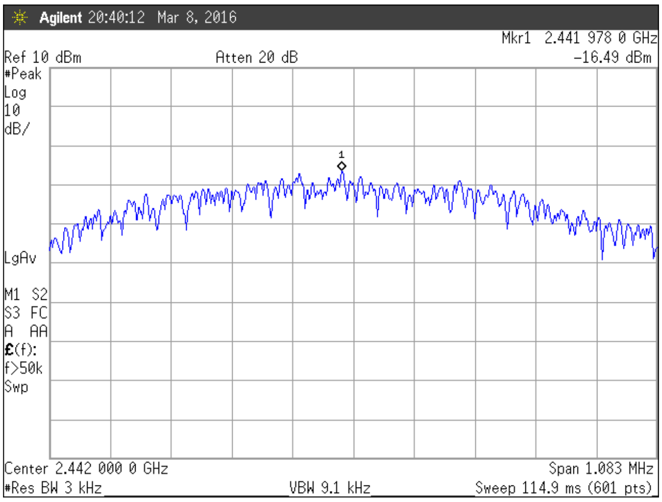
NOTE: We took the insertion loss of the cable loss into consideration within the measuring instrument.

Figure 7. Plot of the Peak Power Spectral Density

Lowest Channel (2402 MHz)



Middle Channel (2442 MHz)



Highest Channel (2480 MHz)